

Book

3

Guidelines and Standards

# Standard and Guide Details



City of San Diego Water Department  
Capital Improvements Program



## **Water CIP Guidelines and Standards**

### **BOOK LISTING**

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|---------------|---|
| <b>Book 1</b> | <b>General Design Guidelines</b>          |
| <b>Book 2</b> | <b>Facility Design Guidelines</b>         |
| <b>Book 3</b> | <b>Standard and Guide Details</b>         |
| <b>Book 4</b> | <b>Standard and Guide Specifications</b>  |
| <b>Book 5</b> | <b>CADD Standards</b>                     |
| <b>Book 6</b> | <b>Construction Management Guidelines</b> |
| <b>Book 7</b> | <b>Recycled Water System Guidelines</b>   |

## PREFACE

This Guidelines and Standards Book contains information to assist planners and engineers with the design and construction of water facilities. The City's intent is to ensure uniformity of design concepts, formats, methodologies, procedures, construction materials, types of equipment and quality of work products. These standards have been produced and adopted to encourage exceptional quality while using current technology for all Water Department facilities.

These Guidelines and Standards are not a substitute for good engineering. Sound judgement must be exercised in all applications to create quality and cost efficient facilities.

Water Department management encourages the creation of relationships between project stakeholders that promotes engineering excellence and timely completion of projects. City staff and consultants are encouraged to take the time at the beginning of all projects to identify common goals, common interests, lines of communication, and a commitment to cooperative problem solving.



LARRY GARDNER  
Water Department Director

# Water CIP Guidelines and Standards

## BOOK 3

### STANDARD AND GUIDE DETAILS

#### Revision Table

#### Civil

Drawing		Initial Issue	Revised Dates		
C	101	October 1999			
C	102	October 1999			
C	103	October 1999			
C	104	October 1999			
C	105	October 1999			

#### Architectural

Drawing		Initial Issue	Revised Dates		
A	201	October 1999			
A	202	October 1999			
A	203	October 1999			
A	204	October 1999			

#### Structural

Drawing		Initial Issue	Revised Dates		
S	301	October 1999			
S	302	October 1999			
S	303	October 1999			
S	304	October 1999			
S	305	October 1999			
S	306	October 1999			
S	307	October 1999			
S	308	October 1999			
S	309	October 1999			
S	310	October 1999			
S	311	October 1999			
S	312	October 1999			
S	313	October 1999			
S	314	October 1999			
S	315	October 1999			
S	316	October 1999			
S	317	October 1999			
S	318	October 1999			



Drawing		Initial Issue	Revised Dates		
S	319	October 1999			
S	320	October 1999			
S	321	October 1999			
S	322	October 1999			
S	323	October 1999			
S	324	October 1999			
S	325	October 1999			
S	326	October 1999			
S	327	October 1999			
S	328	October 1999			
S	329	October 1999			
S	330	October 1999			
S	331	October 1999			
S	332	October 1999			
S	333	October 1999			
S	334	October 1999			
S	335	October 1999			
S	336	October 1999			
S	337	October 1999			
S	338	October 1999			
S	339	October 1999			
S	340	October 1999			
S	341	October 1999			
S	342	October 1999			
S	343	October 1999			
S	344	October 1999			
S	345	October 1999			
S	346	October 1999			

## Mechanical

Drawing		Initial Issue	Revised Dates		
M	401	October 1999			
M	402	October 1999			
M	403	October 1999			
M	404	October 1999			
M	405	October 1999			
M	406	October 1999			
M	407	October 1999			
M	408	October 1999			
M	409	October 1999			
M	410	October 1999			

Drawing		Initial Issue	Revised Dates		
M	411	October 1999			
M	412	October 1999			
M	413	October 1999			
M	414	October 1999			
M	415	October 1999			
M	416	October 1999			
M	417	October 1999			
M	418	October 1999			
M	419	October 1999			
M	420	October 1999			
M	421	October 1999			
M	422	October 1999			
M	423	October 1999			
M	424	October 1999			

## Electrical

Drawing		Initial Issue	Revised Dates		
E	501	October 1999			
E	502	October 1999			
E	503	October 1999			
E	504	October 1999			
E	505	October 1999			
E	506	October 1999			
E	507	October 1999			
E	508	October 1999			
E	509	October 1999			
E	510	October 1999			
E	512	October 1999			
E	513	October 1999			
E	514	October 1999			
E	515	October 1999			

## Instrumentation

Drawing		Initial Issue	Revised Dates		
I	601	October 1999			
I	602	October 1999			
I	603	October 1999			
I	604	October 1999			

Drawing		Initial Issue	Revised Dates		
I	605	October 1999			
I	606	October 1999			
I	607	October 1999			
I	608	October 1999			
I	609	October 1999			
I	610	October 1999			
I	611	October 1999			
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I	618	October 1999			
I	619	October 1999			
I	620	October 1999			
I	621	October 1999			
I	622	October 1999			
I	623	October 1999			
I	624	October 1999			
I	625	October 1999			
I	626	October 1999			
I	627	October 1999			
I	628	October 1999			
I	629	October 1999			
I	630	October 1999			
I	631	October 1999			

## Corrosion Control

Drawing		Initial Issue	Revised Dates		
C	701	October 1999			
C	702	October 1999			
C	703	October 1999			
C	704	October 1999			
C	705	October 1999			
C	706	October 1999			
C	707	October 1999			
C	708	October 1999			
C	709	October 1999			

Drawing		Initial Issue	Revised Dates		
C	710	October 1999			
C	711	October 1999			
C	712	October 1999			
C	713	October 1999			
C	714	October 1999			
C	715	October 1999			
C	716	October 1999			
C	717	October 1999			
C	718	October 1999			
C	719	October 1999			
C	720	October 1999			
C	721	October 1999			
C	722	October 1999			
C	723	October 1999			
C	724	October 1999			
C	725	October 1999			

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## Civil

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C	102	Butt-Welded Steel Pipe Joint
C	103	Butt-Strap Joint for Steel Cylinder Pipe
C	104	Steel Pipe Through or Terminating At Wall
C	105	Steel Casing for Carrier Pipe

## Architectural

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A	202	Louver in Masonry Wall
A	203	Roof Drain and Overflow Pipe
A	204	Roof Hatch Detail

## Structural

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S	302	Foundation or Base Slab Vertical Construction Joint Type 2
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M	404	Fabricated Steel Pipe Thimble Type 1
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M	420	Air Intake or Relief Vent
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## Corrosion Control

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C	724	AC Electrical Splice Box
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## Book 3

# STANDARD AND GUIDE DETAILS

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The standard and guide details have been prepared to be incorporated into Water Department project drawings. The details are available in electronic format and have been developed in Microstation. These details are typically inserted in detail sheets by discipline.

### Related References

In the development of Book 3, the City of San Diego Standard Drawings were referenced. The City of San Diego Standard Drawings include all of the San Diego Area Regional Standard Drawings, as developed by the San Diego Regional Standards Committee, plus those additional standard drawings which are unique to public works construction in the City of San Diego.

Book 2 – Facility Design Guidelines criteria on storage facilities, transmission and distribution pipelines and pumping stations were reviewed in conjunction with these drawings.

Book 4 – Standard and Guide Specifications should be reviewed in conjunction with Book 3, Standard and Guide Details to ensure that the material requirements and other requirements are the same.

Book 5 – CADD Standards describes the standard G-sheets including site plan, abbreviations, symbols, and the standard border. Information on the drawing requirements are included in Book 5.

### Revisions

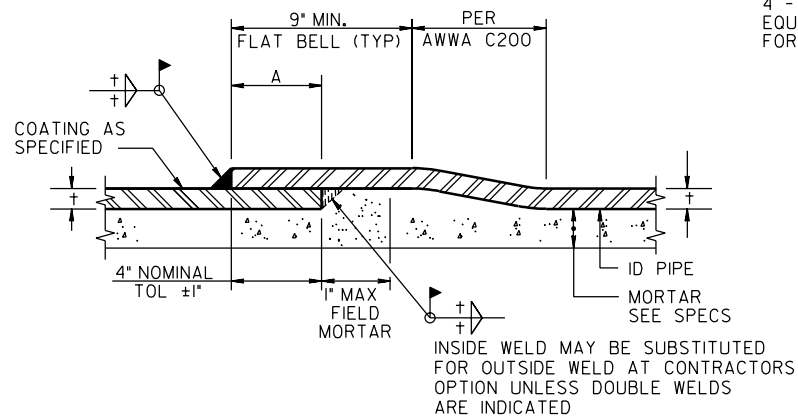
Revisions to these standards or new details will be accepted for review. These should be submitted to the CIP Program Manager at the Water Department following the deviation procedure described in Book 1, General Design Guidelines. Any revisions made to the drawings will be indicated in the revision list at the front of this book.

The DESIGN CONSULTANTS are responsible for the designs and must resolve all conflicts, inconsistencies, errors and omissions in any conflicting or inconsistent guidelines and standards to ensure that the completed designs meet the standards.

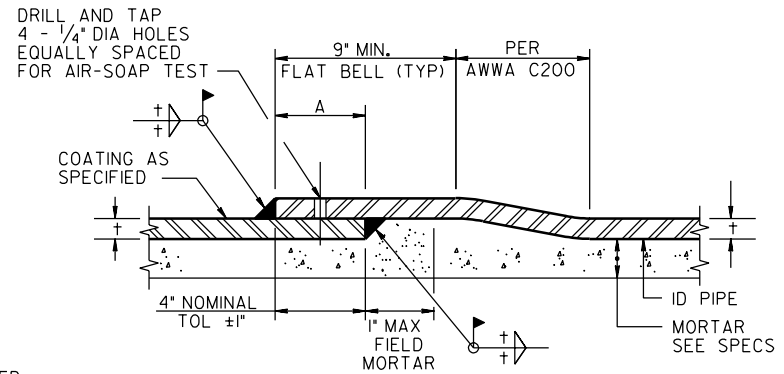
### Numbering Procedures

The standard detail drawings for the CIP are identified by a single discipline letter and a three digit drawing number. To discern between drawing types, the drawing numbers are also grouped according to subject. The table below summarizes the numbering scheme. Note that the corrosion control details are regarded as civil drawings but have been assigned 700 series drawing numbers to denote the specialized nature of their contents.

<b>Discipline</b>	<b>Letter Designator</b>	<b>Drawing Number Series</b>
Civil	C	100's
Architectural	A	200's
Structural	S	300's
Mechanical	M	400's
Electrical	E	500's
Instrumentation	I	600's
Corrosion Control	C	700's



**SINGLE LAP-WELDED SLIP JOINT**



**DOUBLE LAP-WELDED SLIP JOINT**

**NOTES:**

1. SIZE WELD IN ACCORDANCE WITH THE STRUCTURAL WELDING CODE (AMERICAN WELDING SOCIETY)
2. A = 2" MIN FOR PIPE LESS THAN 36" DIA  
A = 3" MIN FOR PIPE 36" AND GREATER - DOUBLE LAP

**LAP-WELDED STEEL PIPE JOINT**



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

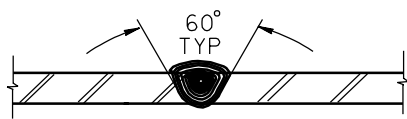


STANDARD  
DETAIL

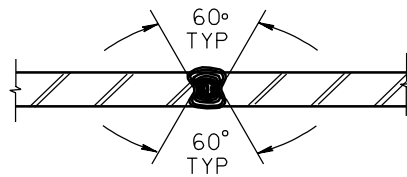
**CIP**

**LAP-WELDED STEEL PIPE JOINT**

**C-101**



SINGLE - BUTT WELD JOINT

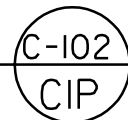


DOUBLE - BUTT WELD JOINT

NOTE:

SIZE WELD IN ACCORDANCE WITH THE STRUCTURAL WELDING CODE  
(AMERICAN WELDING SOCIETY)

BUTT-WELDED STEEL PIPE JOINT



REVISION	BY	APPROVED	DATE

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City of San Diego

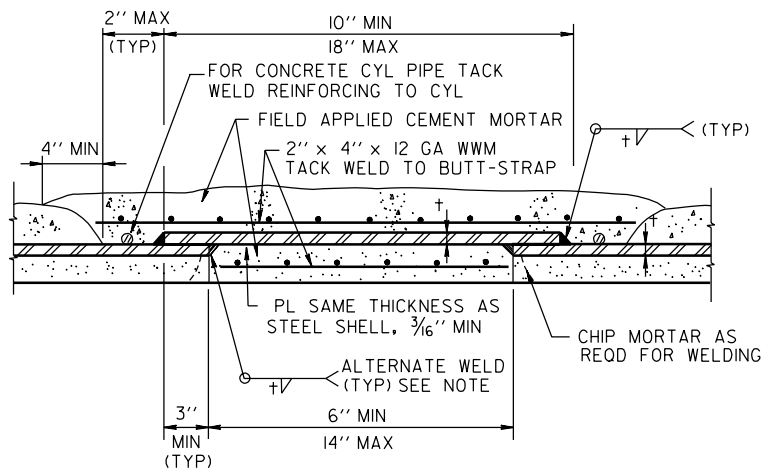


STANDARD  
DETAIL

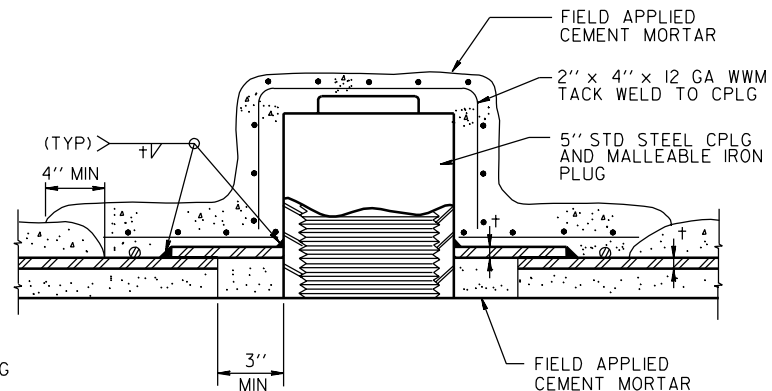
CIP

**BUTT-WELDED STEEL PIPE JOINT**

C-102



**TYPICAL BUTT-STRAP JOINT**



**TYPICAL HANDHOLE**

(REQD ON PIPE SMALLER THAN 24\" DIA)

**NOTES:**

1. WELD BUTT-STRAP INSIDE AND OUTSIDE ON PIPES 36\" AND GREATER
2. ALTERNATE WELD INSIDE OR OUTSIDE ON PIPES LESS THAN 36\"

**BUTT-STRAP JOINT FOR: RC CYLINDER PIPE**

**ROD WRAPPED STEEL CYLINDER PIPE**

**AND MORTAR LINED AND COATED STEEL PIPE**



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REVIEWED BY	INITIALS	DATE	

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City of San Diego

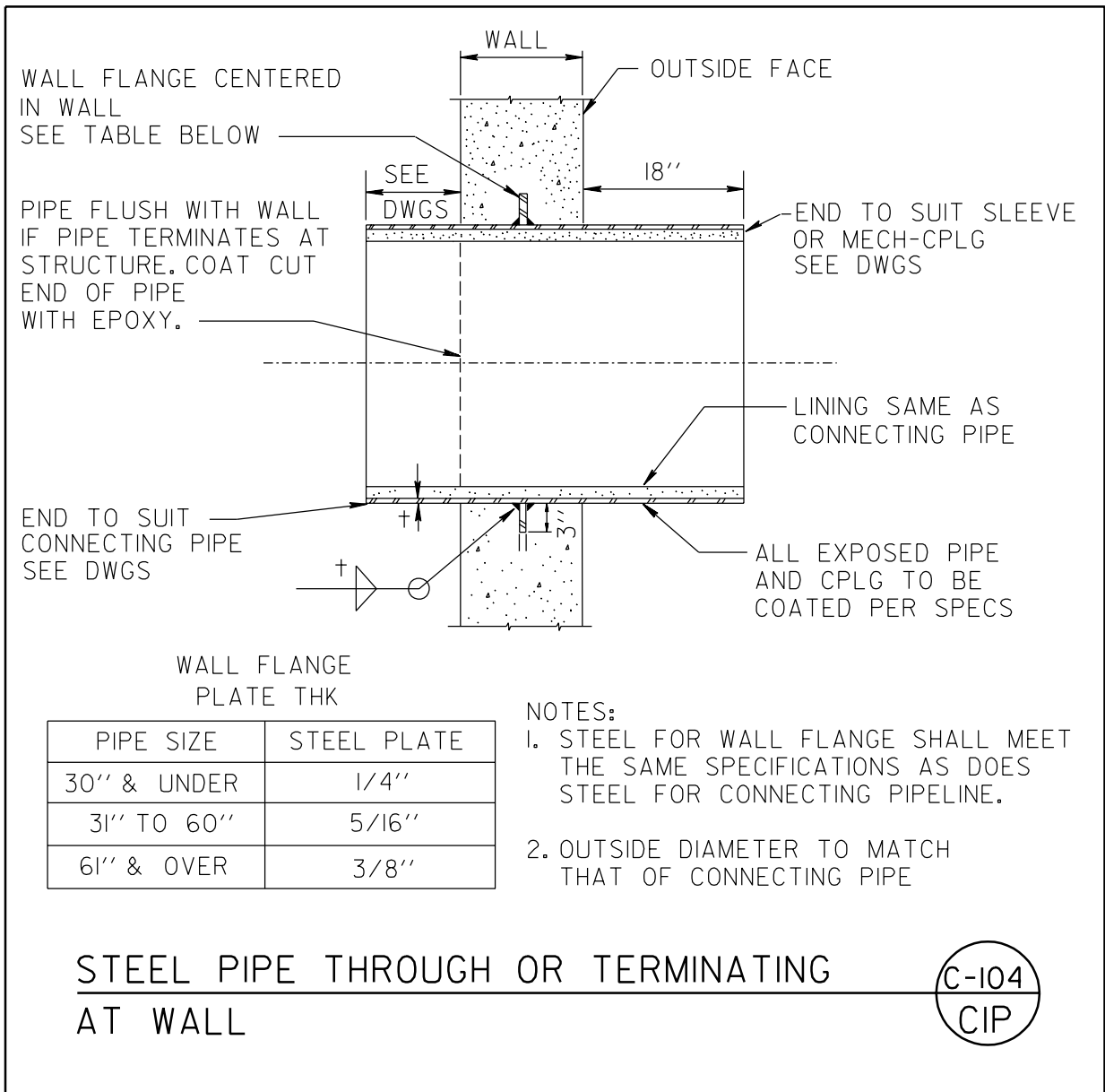


**BUTT-STRAP JOINT  
FOR STEEL CYLINDER PIPE**

STANDARD  
DETAIL

**CIP**


**C-103**



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City of San Diego

**STEEL PIPE THROUGH  
OR TERMINATING AT WALL**



STANDARD DETAIL
CIP
C-104

NOTES:

- 1. ALL JOINTS OF CARRIER PIPE WITHIN CASING SHALL BE WELDED
- 2. CARRIER PIPE SHALL BE TESTED BEFORE INSTALLATION OF END SEALS ON CASING
- 3. CASING SPACERS SHALL BE SO BOLTED AROUND THE PIPE THAT THE PLASTIC RUNNERS ARE LOCATED SYMMETRICALLY ABOUT THE VERTICAL AXIS OF PIPE
- 4. INNER DIAMETER OF THE STEEL CASING SHALL BE AT LEAST 12 INCHES LARGER THAN THE OUTER DIAMETER OF THE CARRIER PIPE

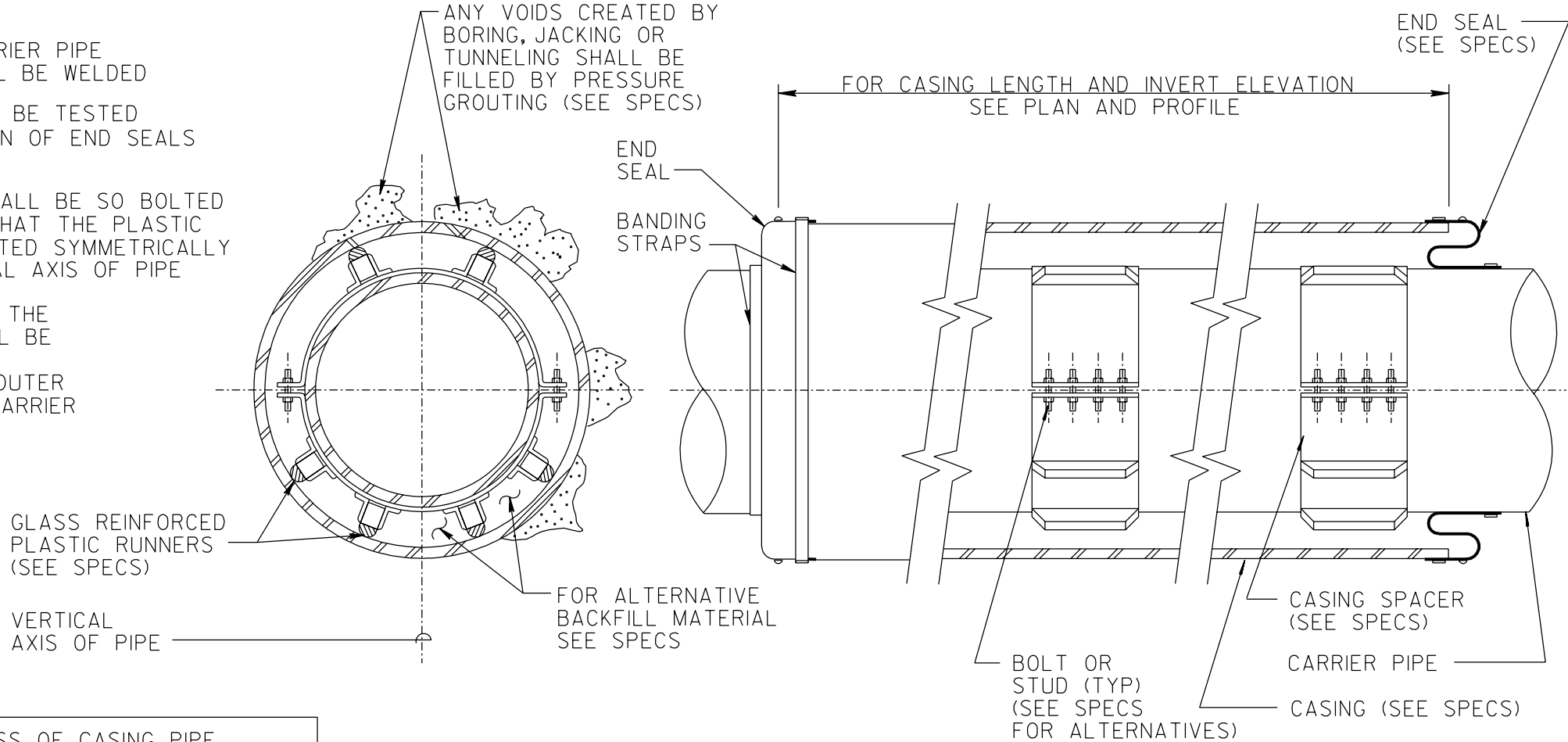


PLATE THICKNESS OF CASING PIPE			
DIAMETER	TO 27"	30" TO 54"	60" TO 72"
MINIMUM THICKNESS	3/8"	1/2"	5/8"


CASING SHALL BE SMOOTH STEEL PIPE

STEEL CASING FOR CARRIER PIPE  
(SEE SPECS FOR ALTERNATIVES)

C-105  
CIP

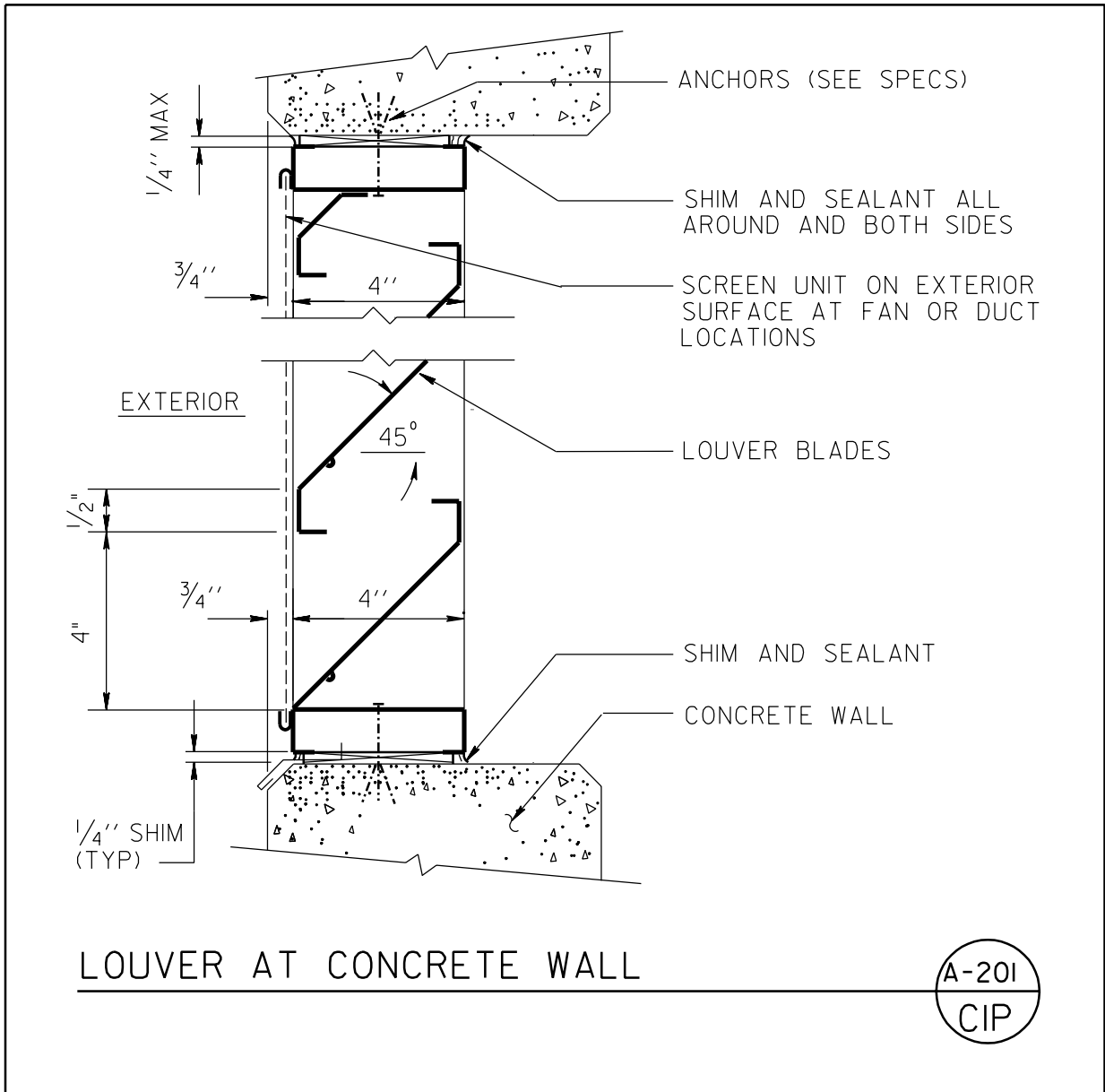
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City of San Diego



STEEL CASING FOR CARRIER PIPE

STANDARD DETAIL
CIP
C-105



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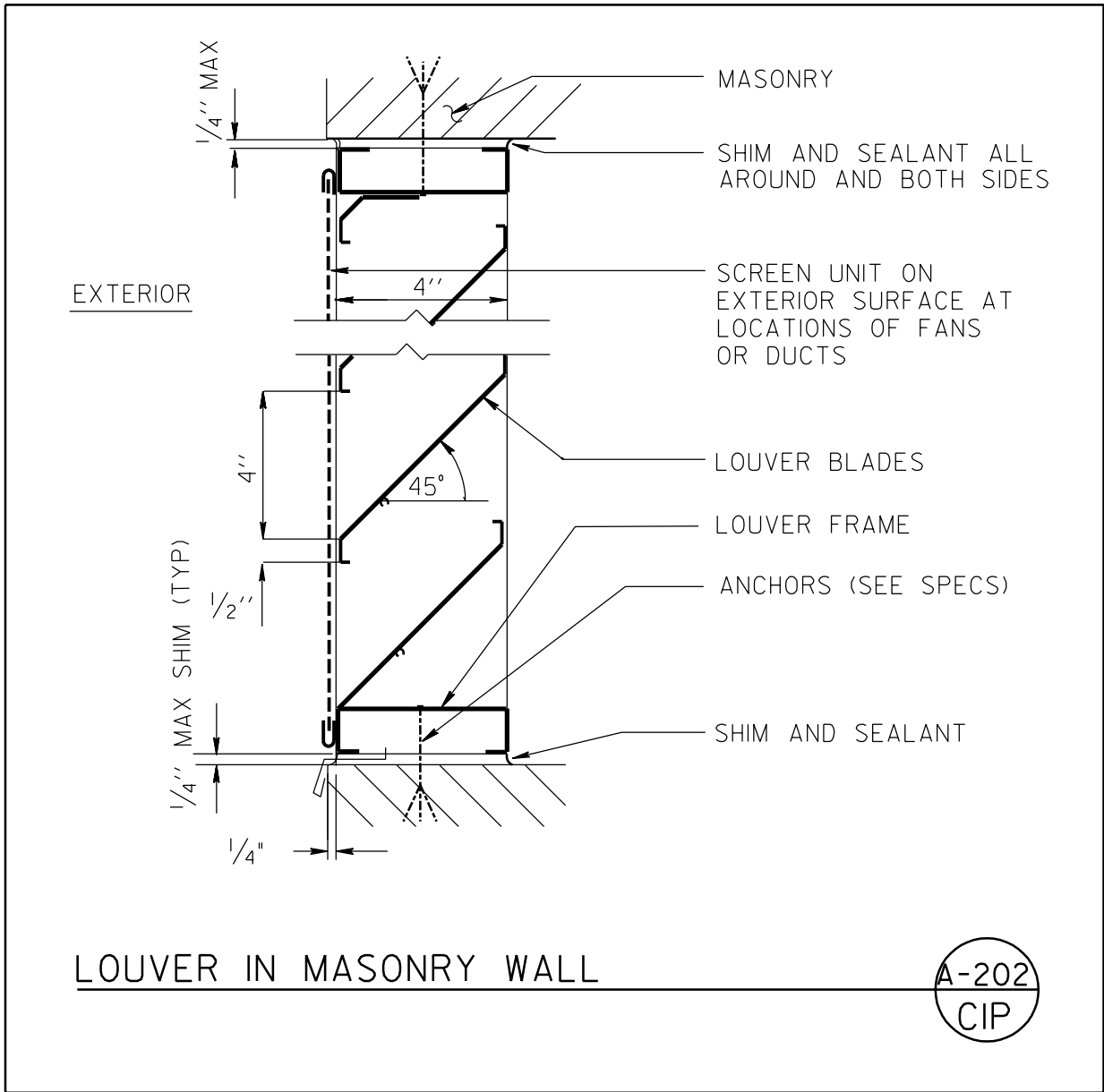
STANDARD  
DETAIL

CIP

A-201

**LOUVER AT CONCRETE WALL**





REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

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City of San Diego

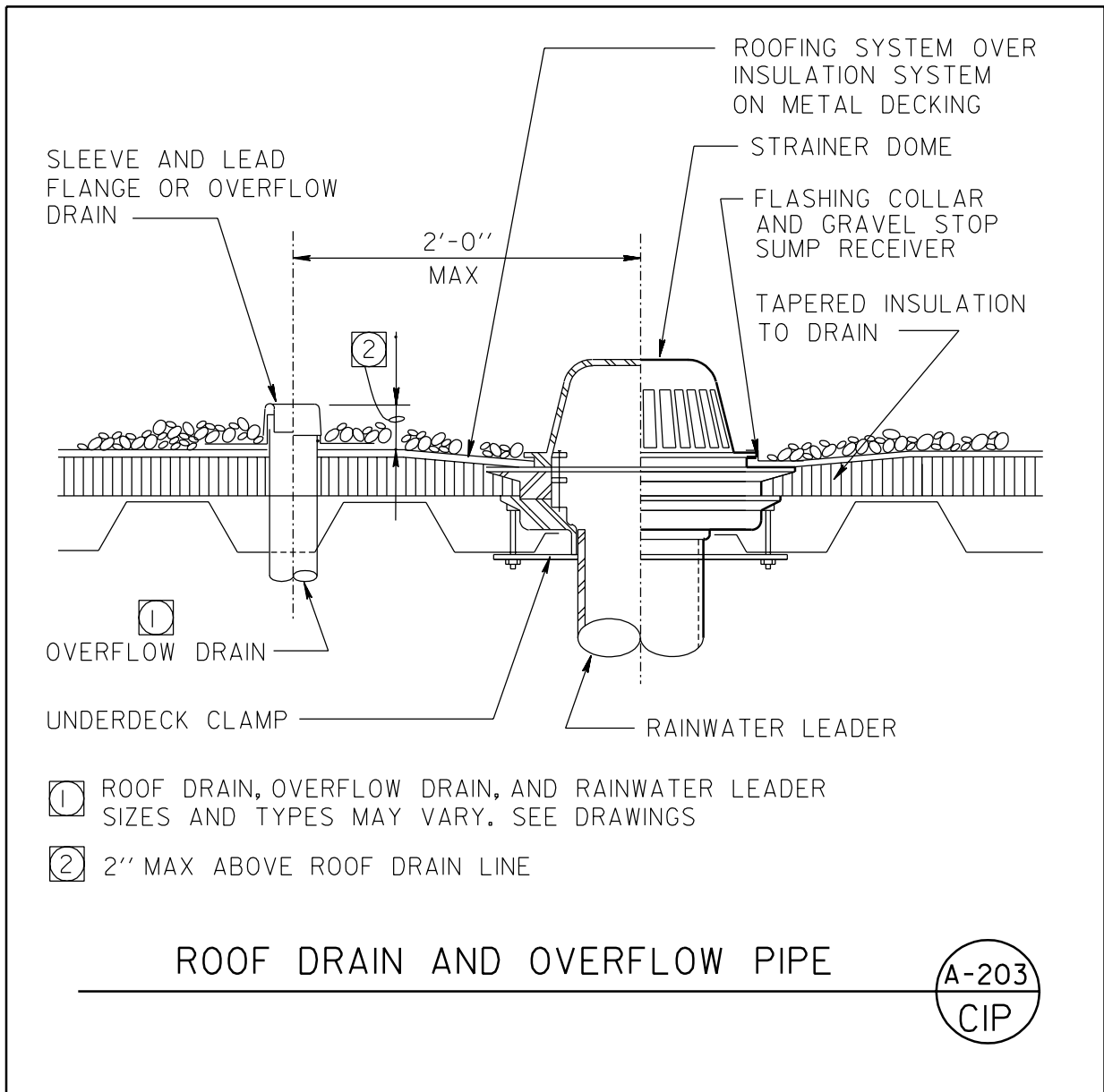


STANDARD  
DETAIL

CIP

LOUVER IN MASONRY WALL

A-202



REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego

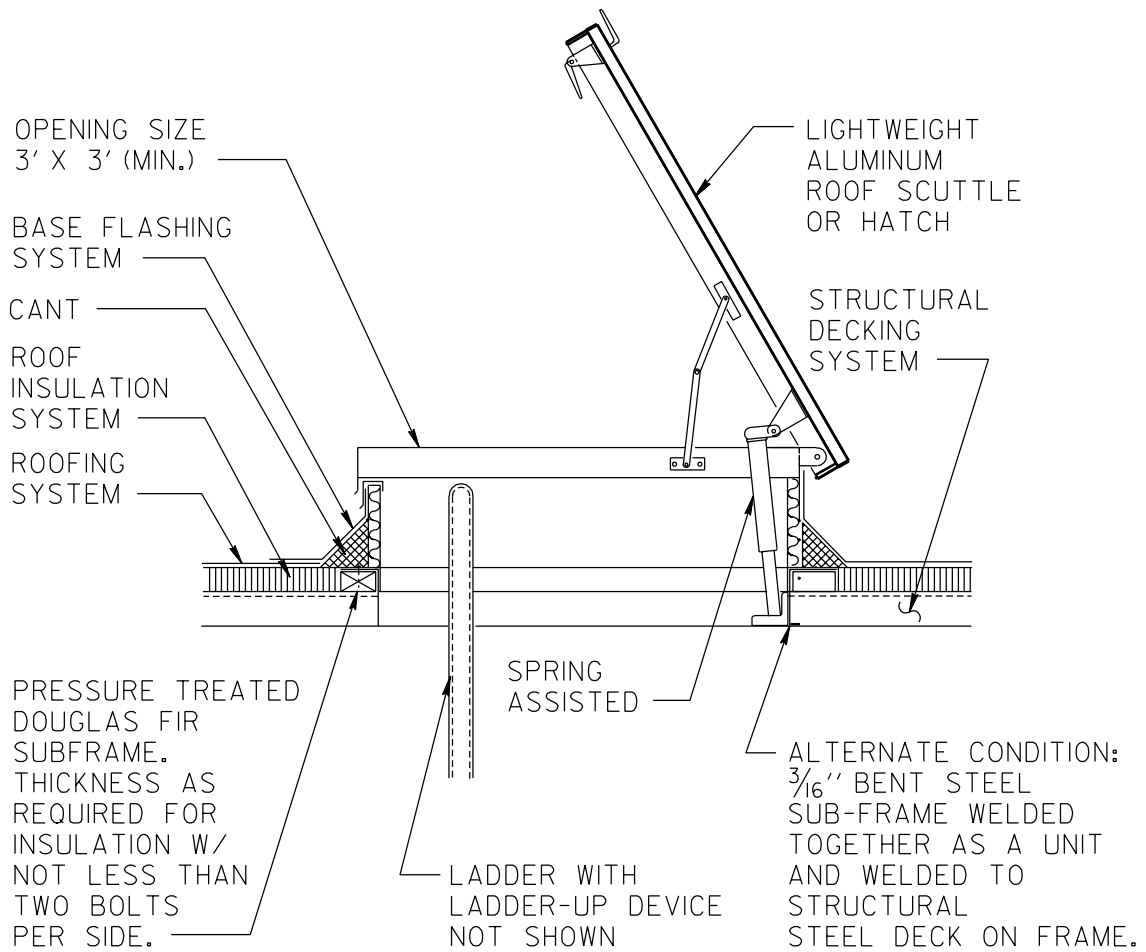


STANDARD  
DETAIL

CIP

**ROOF DRAIN AND OVERFLOW PIPE**

**A-203**



**ROOF HATCH DETAIL**

A-204  
CIP

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**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

**ROOF HATCH DETAIL**

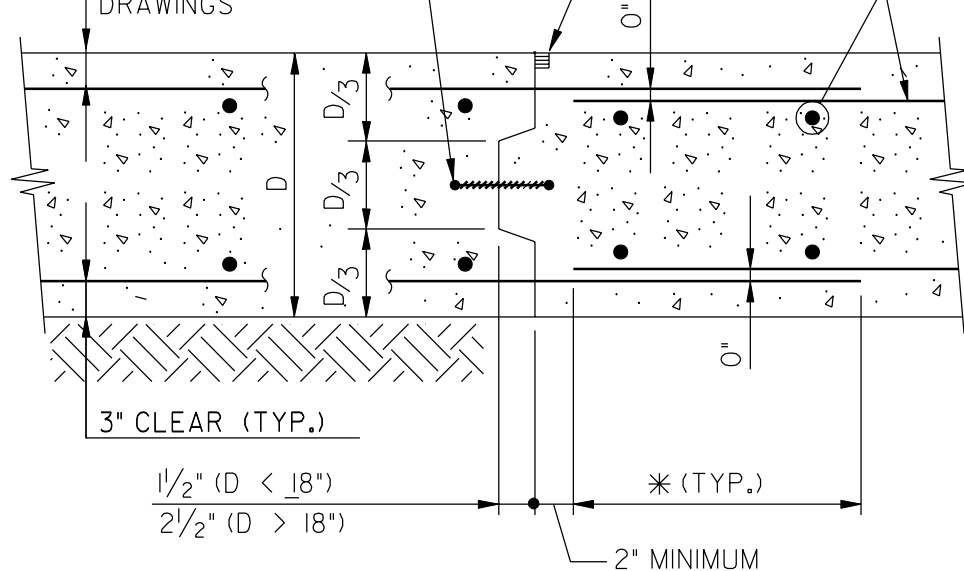
A-204

WATERSTOP WHERE  
INDICATED ON DRAWINGS.  
SEE STANDARD DETAIL S-313

2" CLEAR (TYP.)  
UNLESS OTHERWISE  
INDICATED ON  
DRAWINGS

1/2" x 1/2" SEALANT  
WHERE INDICATED  
ON DRAWINGS

REINFORCING AS  
INDICATED ON  
DRAWINGS



\* OPTIONAL TENSION LAP SPLICES PER GENERAL STRUCTURAL  
NOTES UNLESS OTHERWISE INDICATED ON DRAWINGS

## FOUNDATION OR BASE SLAB VERTICAL CONSTRUCTION JOINT TYPE I

S-301

CIP

Notes to Design Consultant:

1. This detail is to be used for strip footings under walls and for mat-type foundation slabs.  
Locate joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings  
if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

FOUNDATION OR BASE SLAB VERTICAL  
CONSTRUCTION JOINT TYPE I

S-301

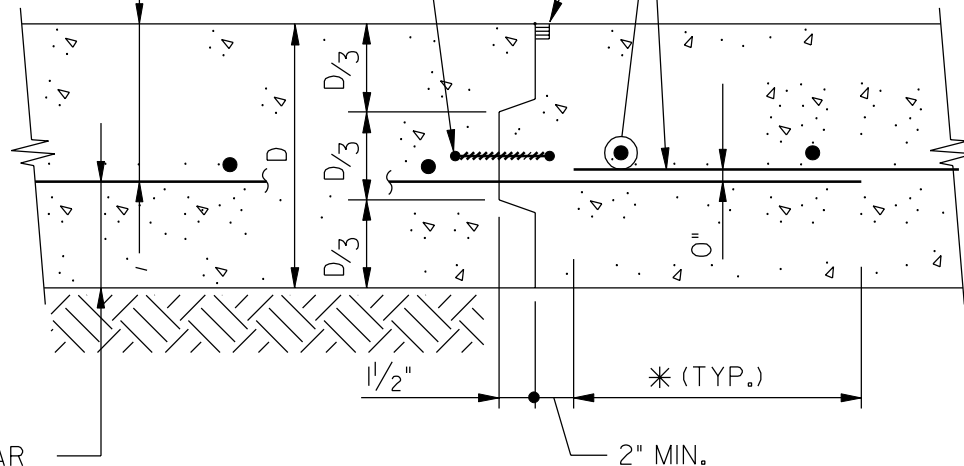
WATERSTOP WHERE  
INDICATED ON DRAWINGS.  
SEE STANDARD DETAIL S-313

2" CLEAR  
(MIN.)

1/2" x 1/2" SEALANT  
WHERE INDICATED  
ON DRAWINGS

REINFORCING AS  
INDICATED ON  
DRAWINGS

3" CLEAR  
(MIN.)



\* OPTIONAL TENSION LAP SPLICES PER GENERAL STRUCTURAL  
NOTES UNLESS OTHERWISE INDICATED ON DRAWINGS

## FOUNDATION OR BASE SLAB VERTICAL CONSTRUCTION JOINT TYPE 2

S-302

CIP

Notes to Design Consultant: \_\_\_\_\_

1. This detail is to be used for strip footings under walls and for mat-type foundation slabs.  
Locate joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2" x 1/2" joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



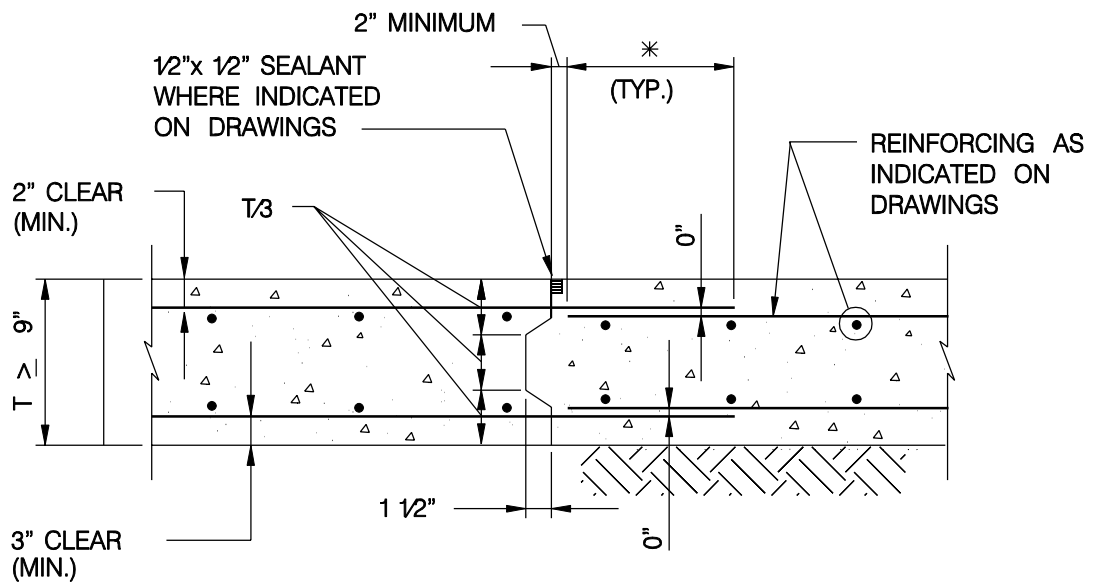
STANDARD  
DETAIL

CIP

FOUNDATION OR BASE SLAB VERTICAL  
CONSTRUCTION JOINT TYPE 2

S-302

\* OPTIONAL TENSION LAP SPLICES AS  
PER GENERAL STRUCTURAL NOTES  
UNLESS OTHERWISE INDICATED  
ON DRAWINGS



SLAB-ON-GRADE CONSTRUCTION JOINT  
TYPE I

S-303

CIP

Notes to Design Consultant:

1. This detail should be used for slab-on-grade for buildings and non-water bearing structures subject to heavy uniform and vehicular traffic loadings. Locate joints on drawings.
2. Call 1/2 "x 1/2 " joint sealant drawings where required and specification for material.
3. Location (cover) of reinforcing shall be clearly defined on the drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego

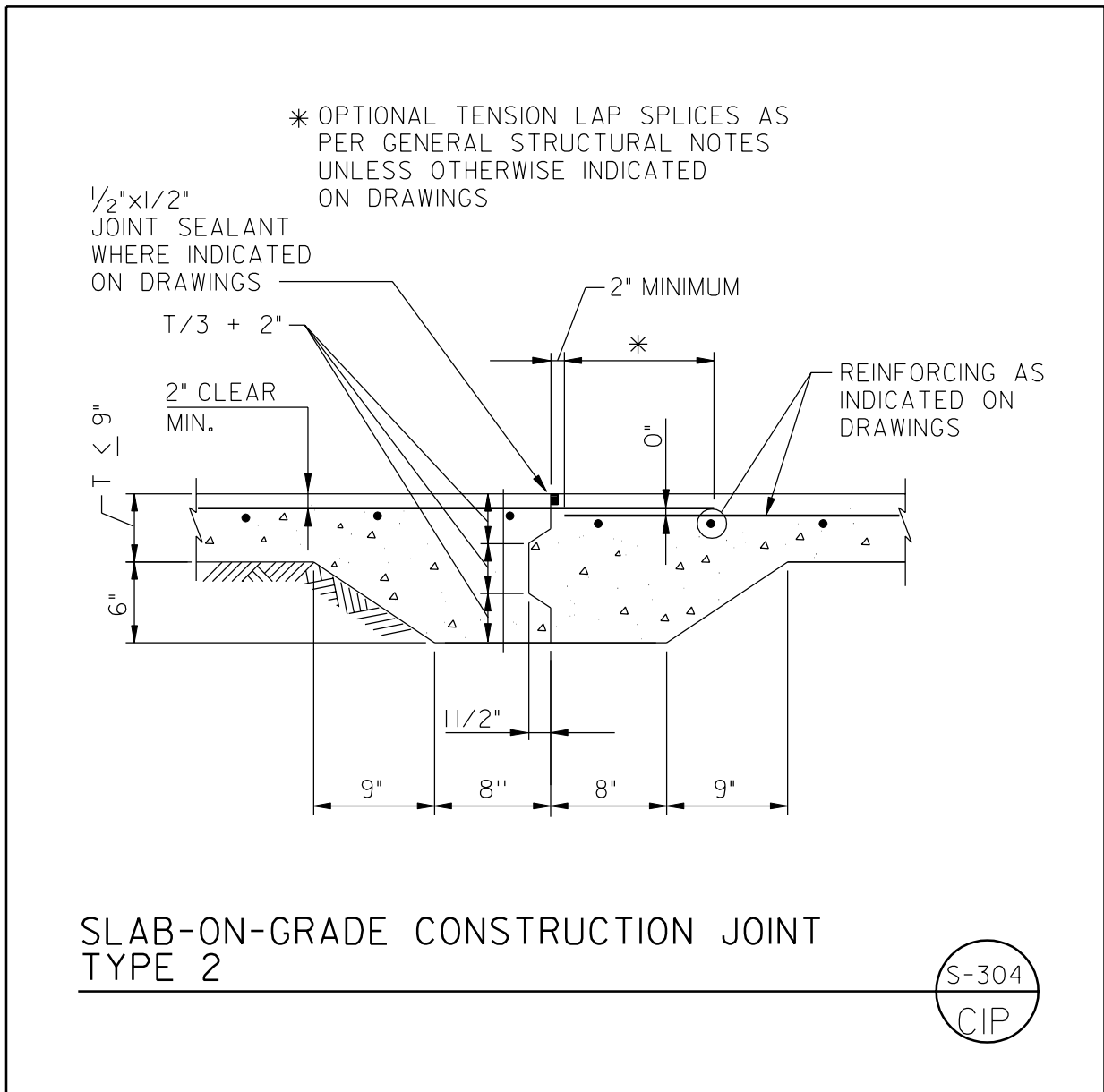


STANDARD  
DETAIL

CIP

SLAB-ON-GRADE  
CONSTRUCTION JOINT TYPE I

S-303



Notes to Design Consultant:

1. This detail should be used for slab-on-grade for buildings and non-water bearing structures is subject to light uniform loading.
2. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
3. Location (cover) of reinforcing shall be clearly defined on the drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego

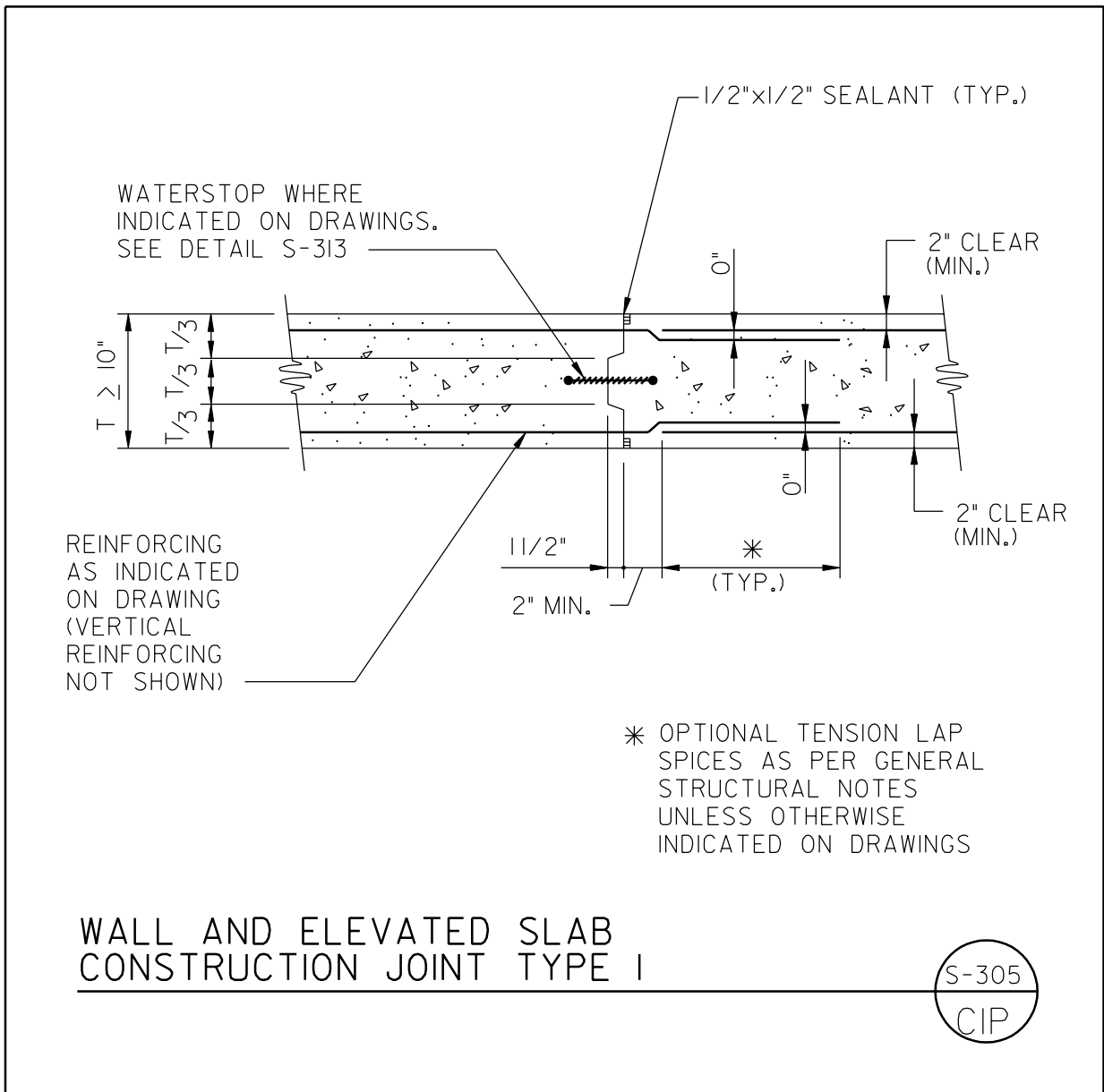


STANDARD  
DETAIL

CIP

SLAB-ON-GRADE  
CONSTRUCTION JOINT TYPE 2

S-304



Notes to Design Consultant: \_\_\_\_\_

1. Located joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego



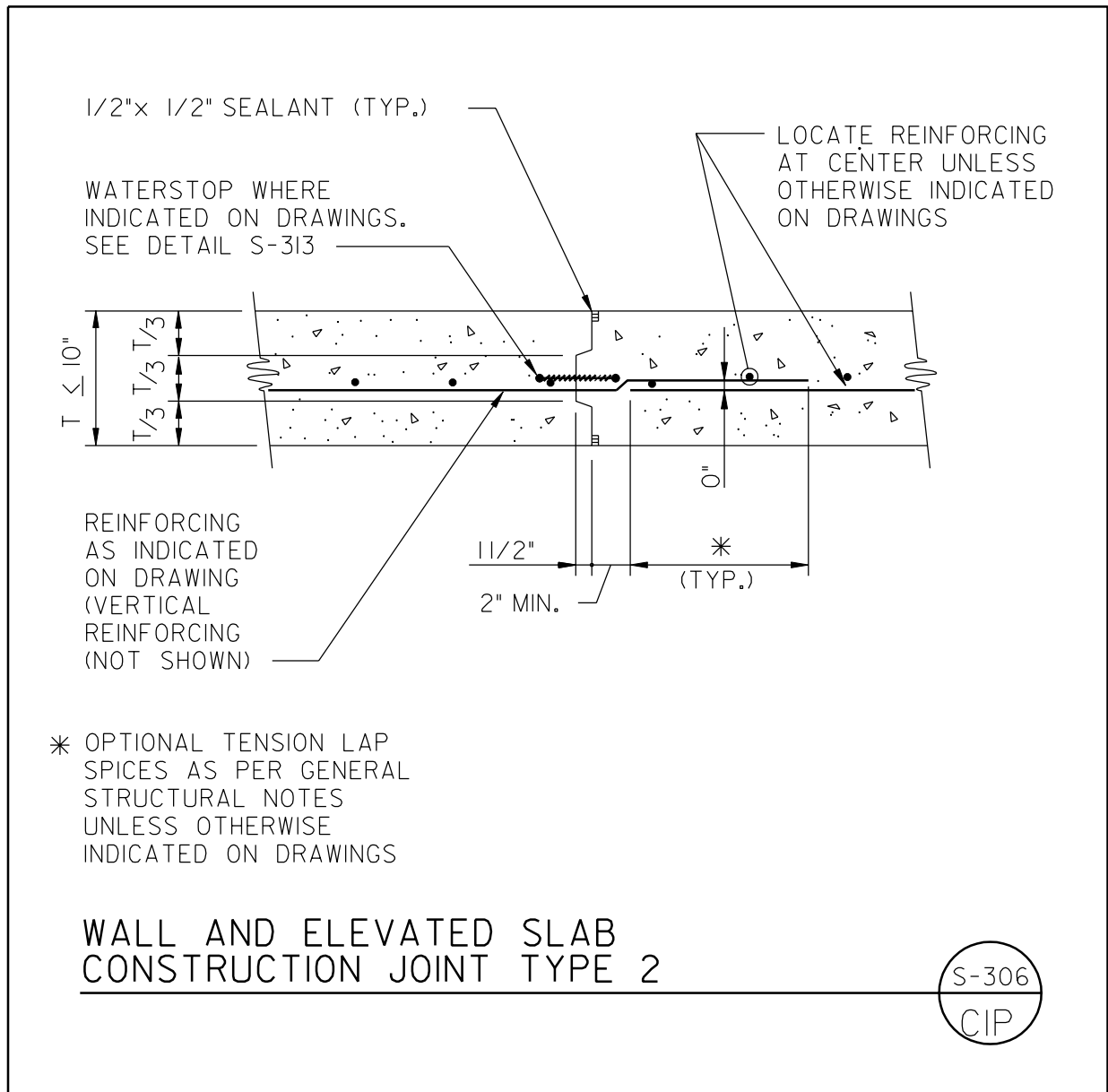
STANDARD  
DETAIL

CIP

WALL AND ELEVATED SLAB  
CONSTRUCTION JOINT TYPE I

S-305





Notes to Design Consultant:

1. Located joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



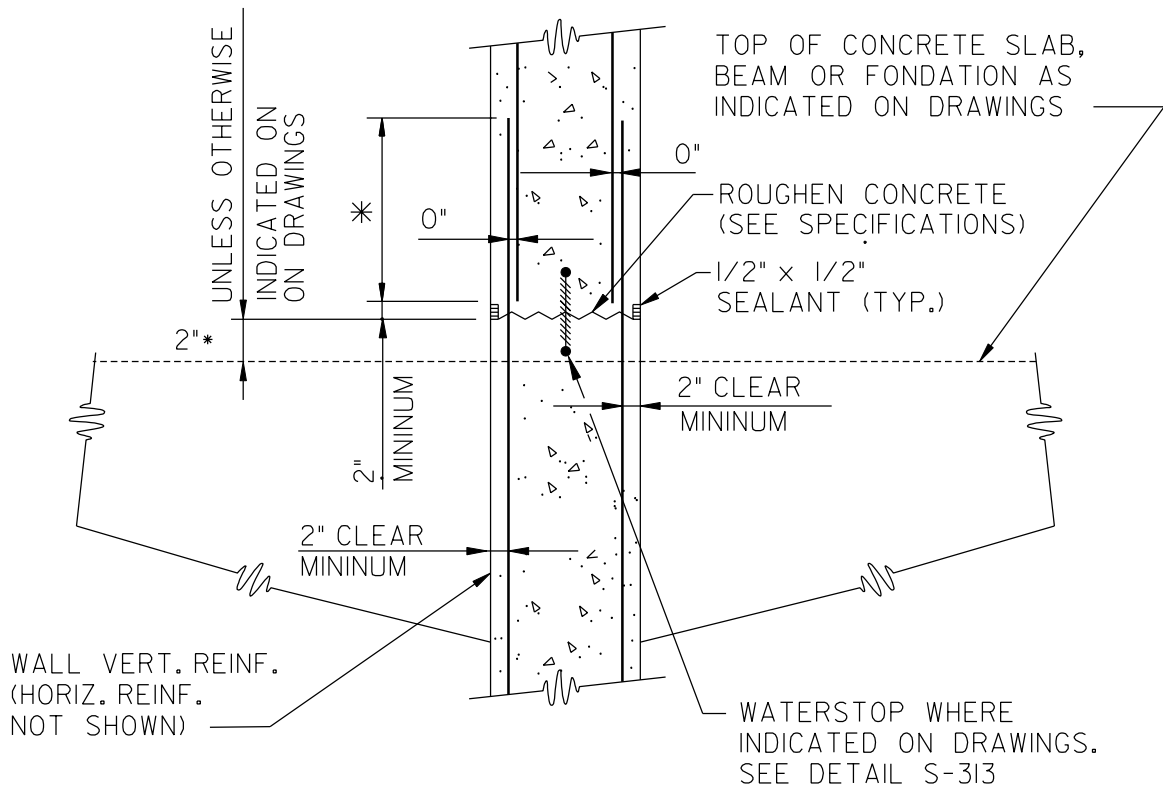
**WALL AND ELEVATED SLAB  
CONSTRUCTION JOINT TYPE 2**

STANDARD  
DETAIL

CIP

S-306

\* TENSION LAP SPLICES  
AS PER GENERAL  
STRUCTURAL NOTES  
UNLESS OTHERWISE  
INDICATED ON DRAWINGS



**WALL HORIZONTAL CONSTRUCTION JOINT  
TYPE I**

S-307  
CIP

**Notes to Design Consultant:**

1. Located joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



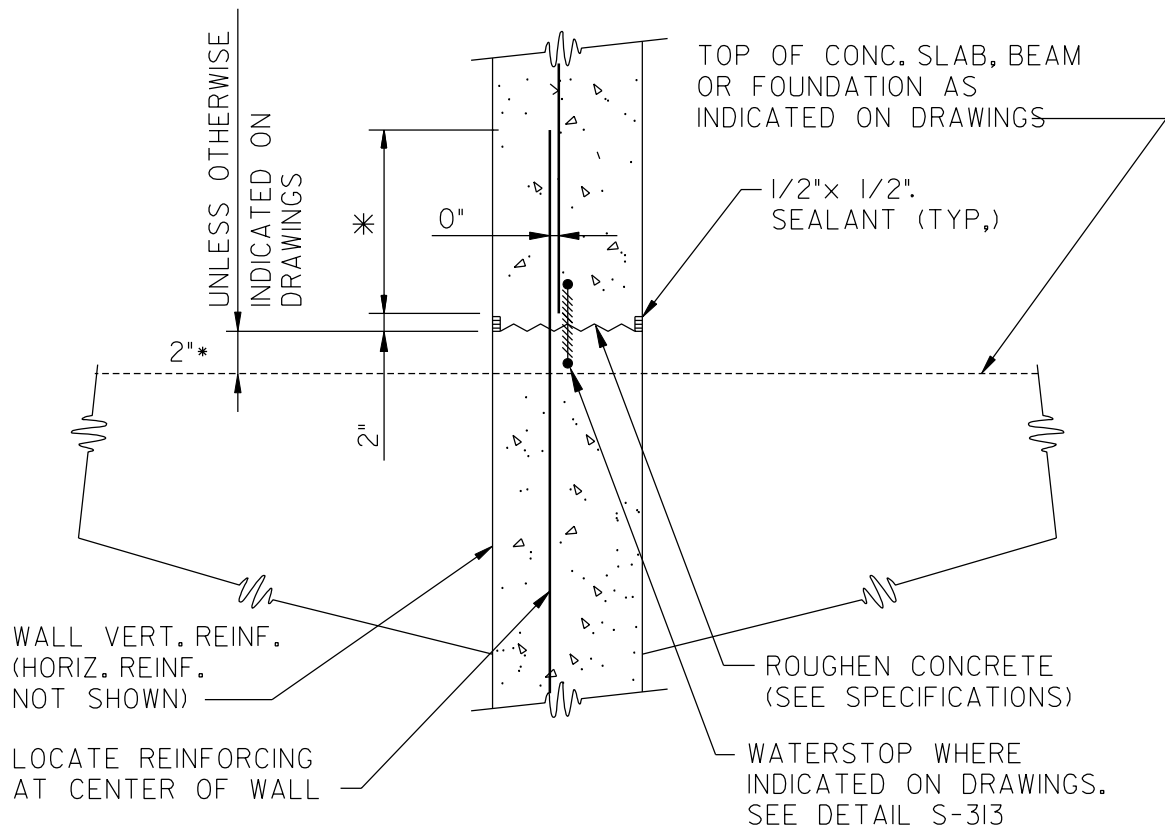
**WALL HORIZONTAL  
CONSTRUCTION JOINT TYPE I**

STANDARD  
DETAIL

CIP

S-307

\* TENSION LAP SPLICES  
PER GENERAL  
STRUCTURAL NOTES  
UNLESS OTHERWISE  
INDICATED ON DRAWINGS



**WALL HORIZONTAL CONSTRUCTION JOINT  
TYPE 2**

S-308  
CIP

**Notes to Design Consultant:**

1. Located joints on drawings.
2. Call out waterstop on drawings where required.
3. Callout 1/2 "x 1/2 " joint sealant on drawings where required and see specification for material.
4. Location (cover) of reinforcing shall be clearly defined on drawings if different than shown on this detail.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

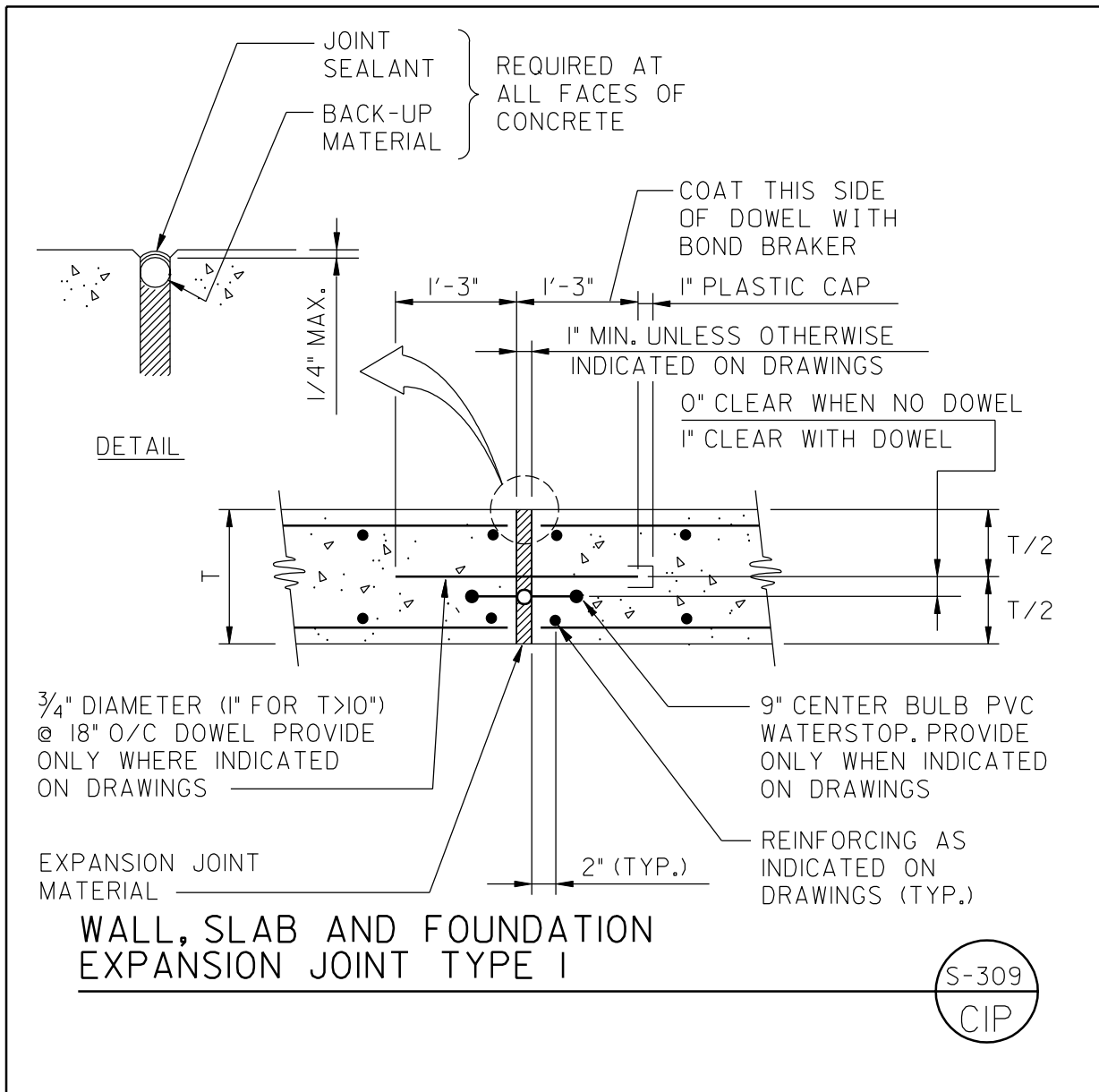


**WALL HORIZONTAL  
CONSTRUCTION JOINT TYPE 2**

STANDARD  
DETAIL

CIP

S-308



Notes to Design Consultant:

1. Provide dowels if concrete is subject to heavy load which must be transferred across joint. Locate joints on drawings.
2. Call out waterstop and dowels on drawing where required.
3. Specify joint sealant, expansion material and back-up material in project technical specifications.
4. Location (cover) of reinforcing shall be clearly defined on drawings.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

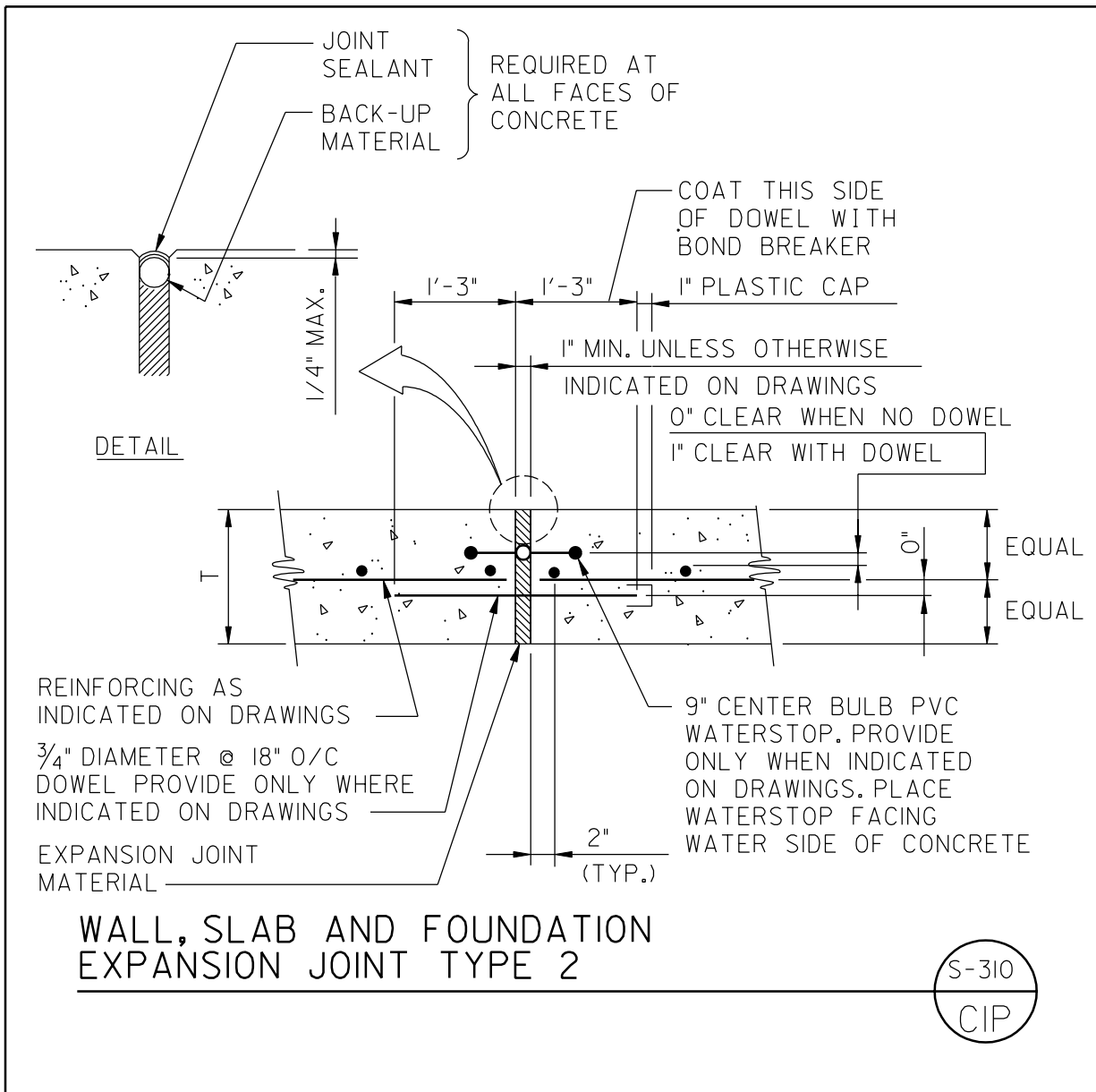


STANDARD  
DETAIL

CIP

**WALL, SLAB AND FOUNDATION  
EXPANSION JOINT TYPE I**

S-309



Notes to Design Consultant:

1. Provide dowels if concrete subject to heavy load which must be transferred across joint.
2. Call out waterstop and dowels on drawing where required.
3. The specification will more fully describe joint materials.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

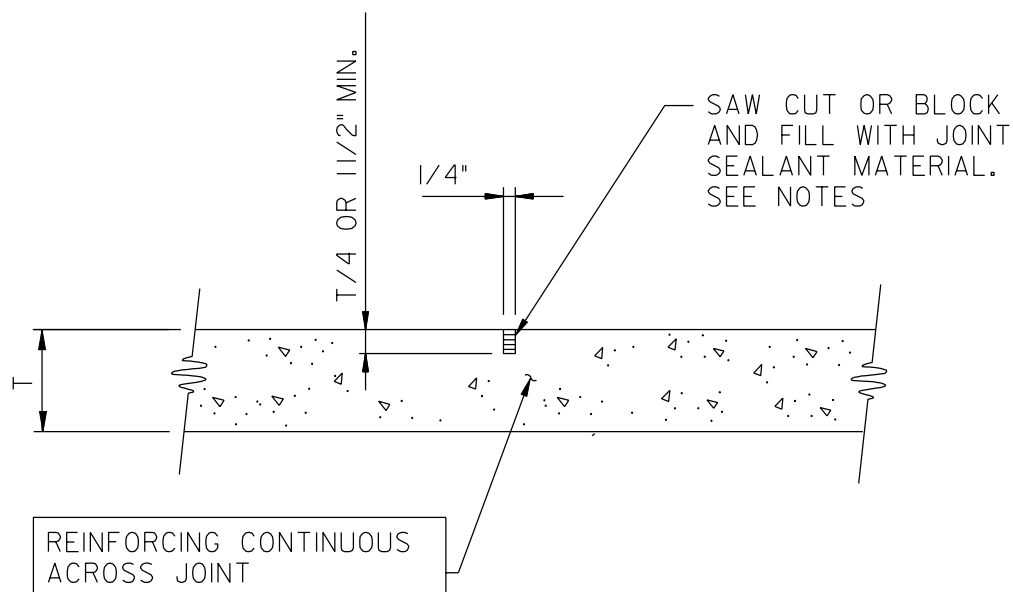


**WALL, SLAB AND FOUNDATION  
EXPANSION JOINT TYPE 2**

STANDARD  
DETAIL

CIP

S-310



NOTES:

1. FOR WALLS, PROVIDE JOINTS ON BOTH FACES.
2. FOR SLAB-ON-GRADE, PROVIDE JOINT ON EXPOSED FACE ONLY.

WALL AND SLAB-CONTROL JOINT TYPE I

S-311

CIP

Notes to Design Consultants:

1. Locate joints on drawings.
2. Specify joint sealant requirements in project technical specifications.
3. Do not specify use of plastic strip in lieu of joint sealant.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

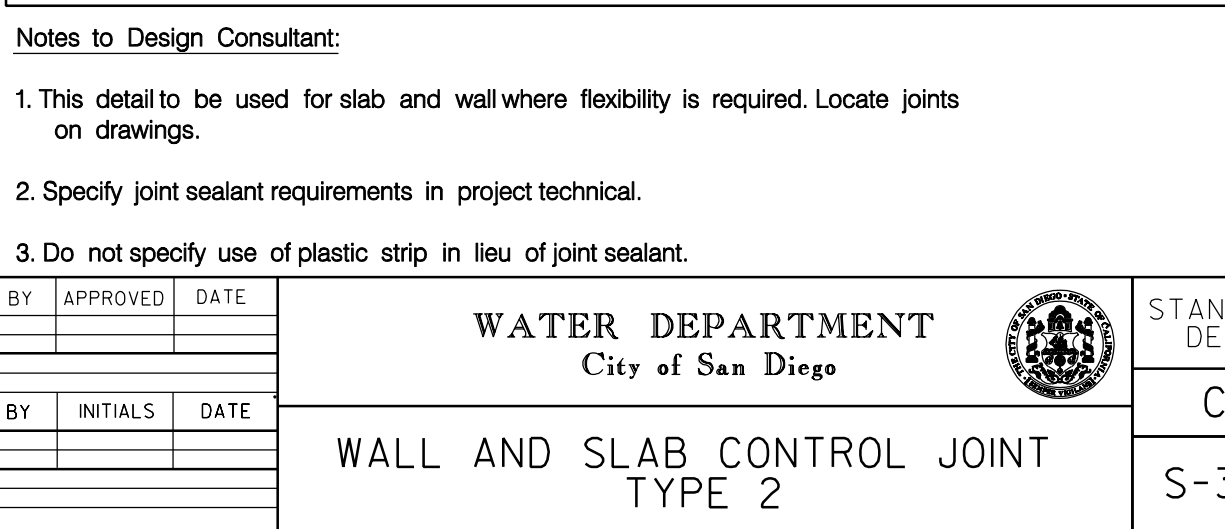


**WALL AND SLAB CONTROL JOINT  
TYPE I**


STANDARD  
DETAIL

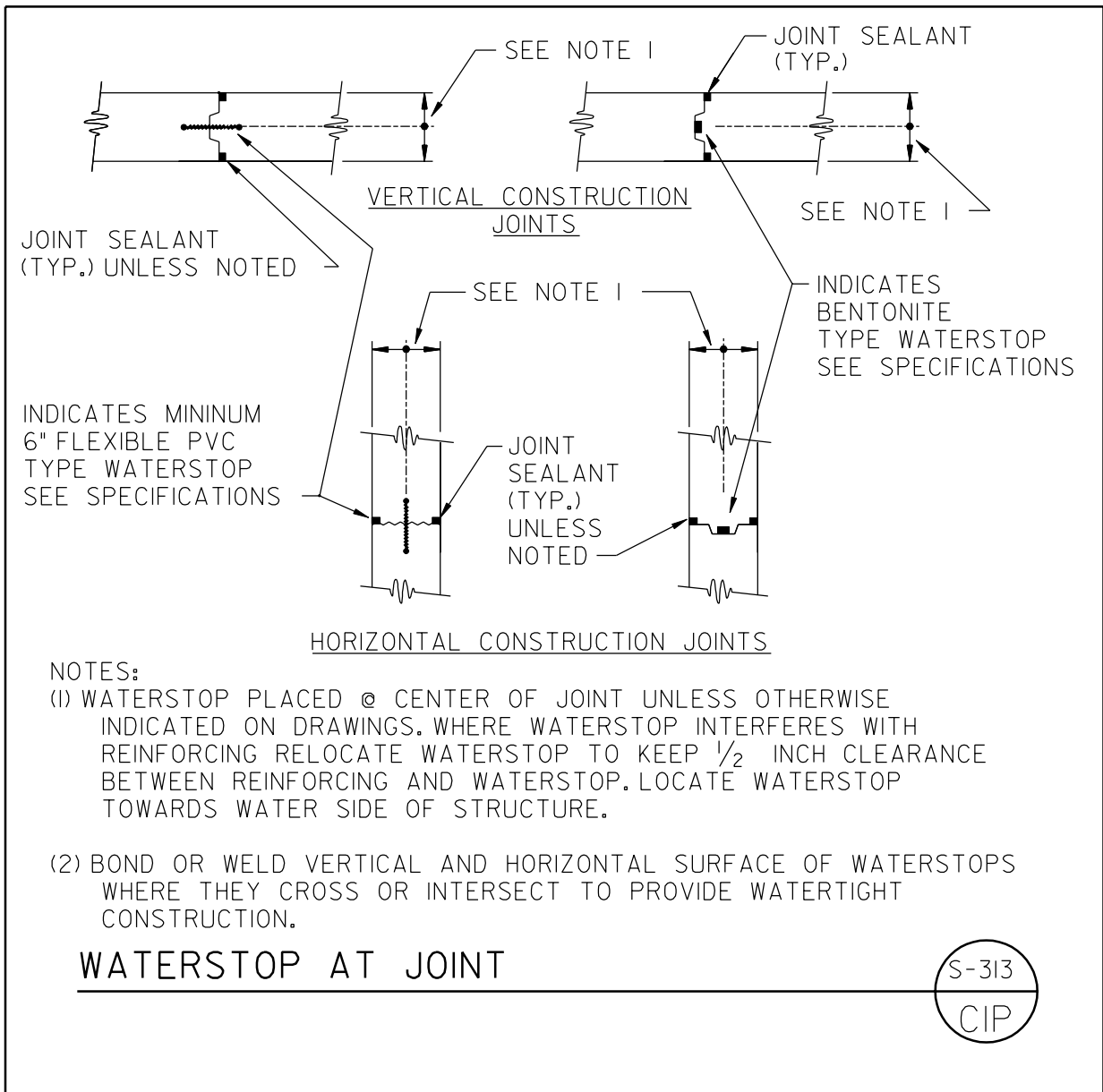
CIP

S-311



1. This detail to be used for slab and wall where flexibility is required. Locate joints on drawings.
2. Specify joint sealant requirements in project technical.
3. Do not specify use of plastic strip in lieu of joint sealant.

REVISION	BY	APPROVED	DATE	<div>WATER DEPARTMENT</div> <div>City of San Diego</div> <div></div>	STANDARD DETAIL
					CIP
					<div>WALL AND SLAB CONTROL JOINT</div> <div>TYPE 2</div>
REVIEWED BY	INITIALS	DATE			



Notes to Design Consultant:

1. Type and location of waterstop shall be indicated on drawings.
2. Use of joint sealant with construction joint shall be indicated on drawings.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



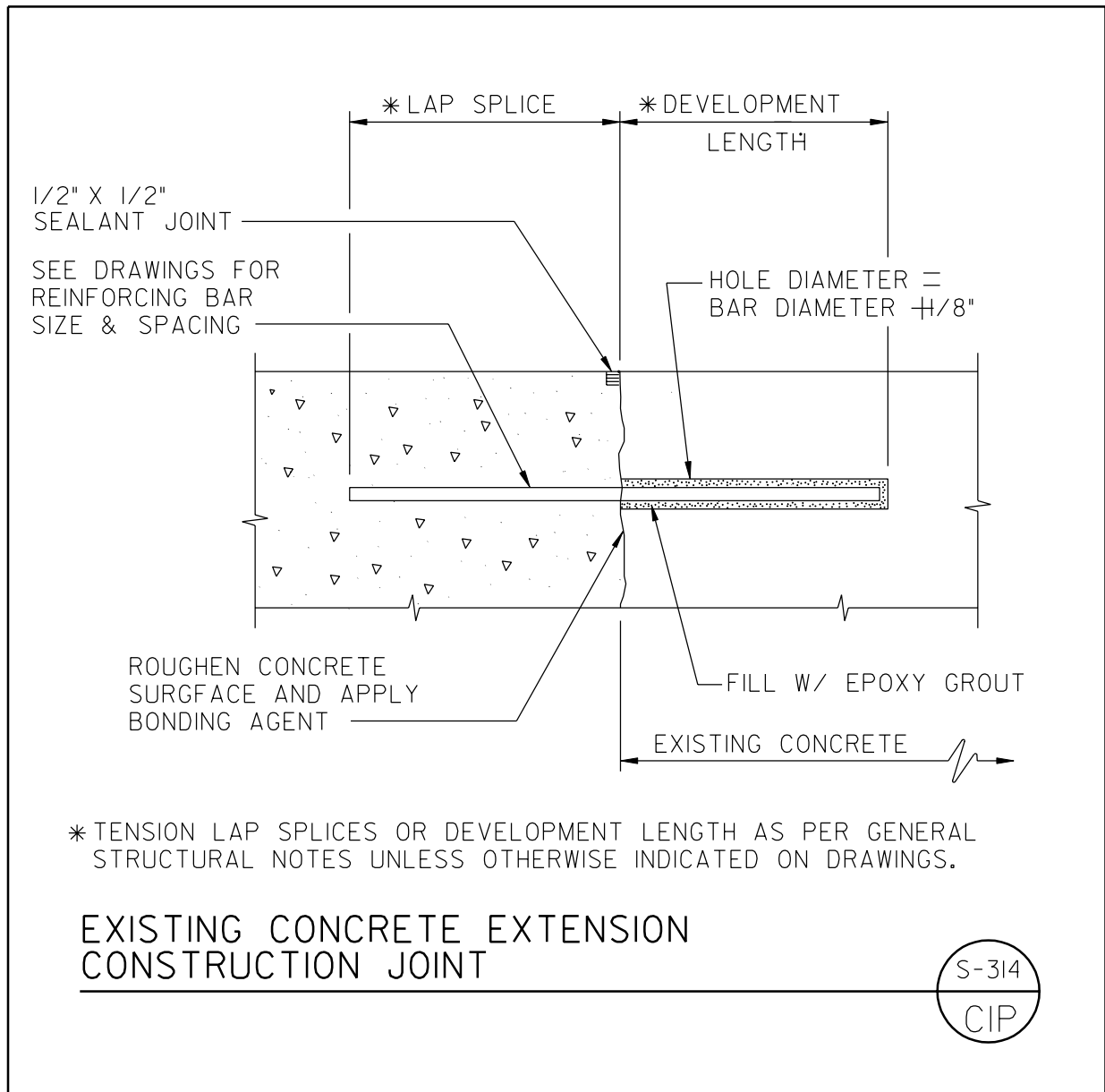
**WATERSTOP AT JOINT**

STANDARD  
DETAIL

CIP

S-313





Notes to Design Consultant:

1. To be used where continuity required between existing concrete and new concrete. Located joint on drawings.
2. Specify surface joint preparation, bonding agent and joint sealant requirement in project technical specifications.
3. Reinforcing size and spacing should be indicated on drawings.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

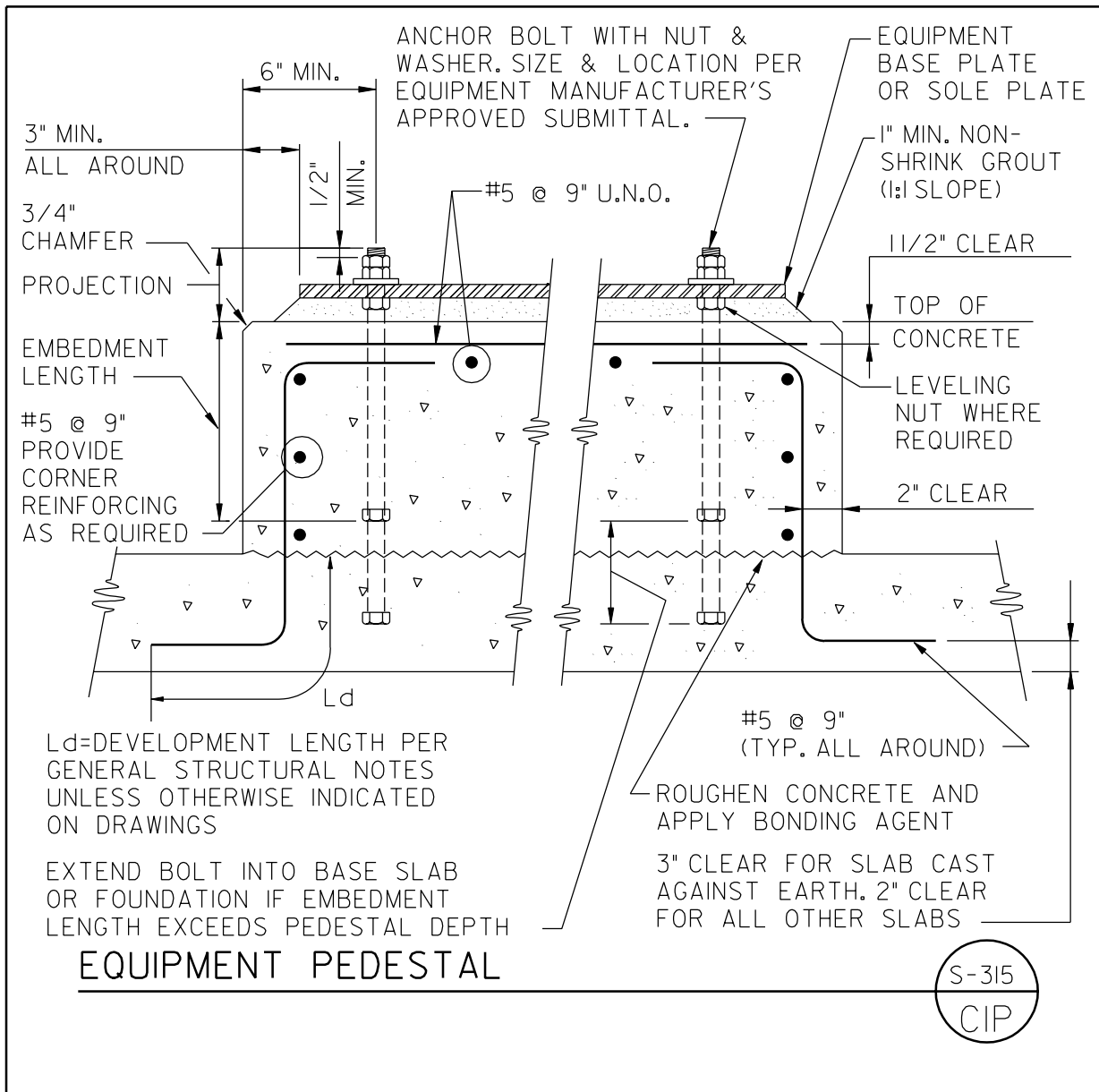


STANDARD  
DETAIL

CIP

**EXISTING CONCRETE EXTENSION  
CONSTRUCTION JOINT**

S-314



Notes to Design Consultant:

1. This detail to be used for light & medium weight equipment base. Adequacy shall be verified for heavy equipment base.
2. Pedestal reinforcing adequacy shall be verified.
3. Anchor bolt requirements shall be verified. Anchor bolt projection and embedment length shall be verified and adjusted to meet design requirements.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

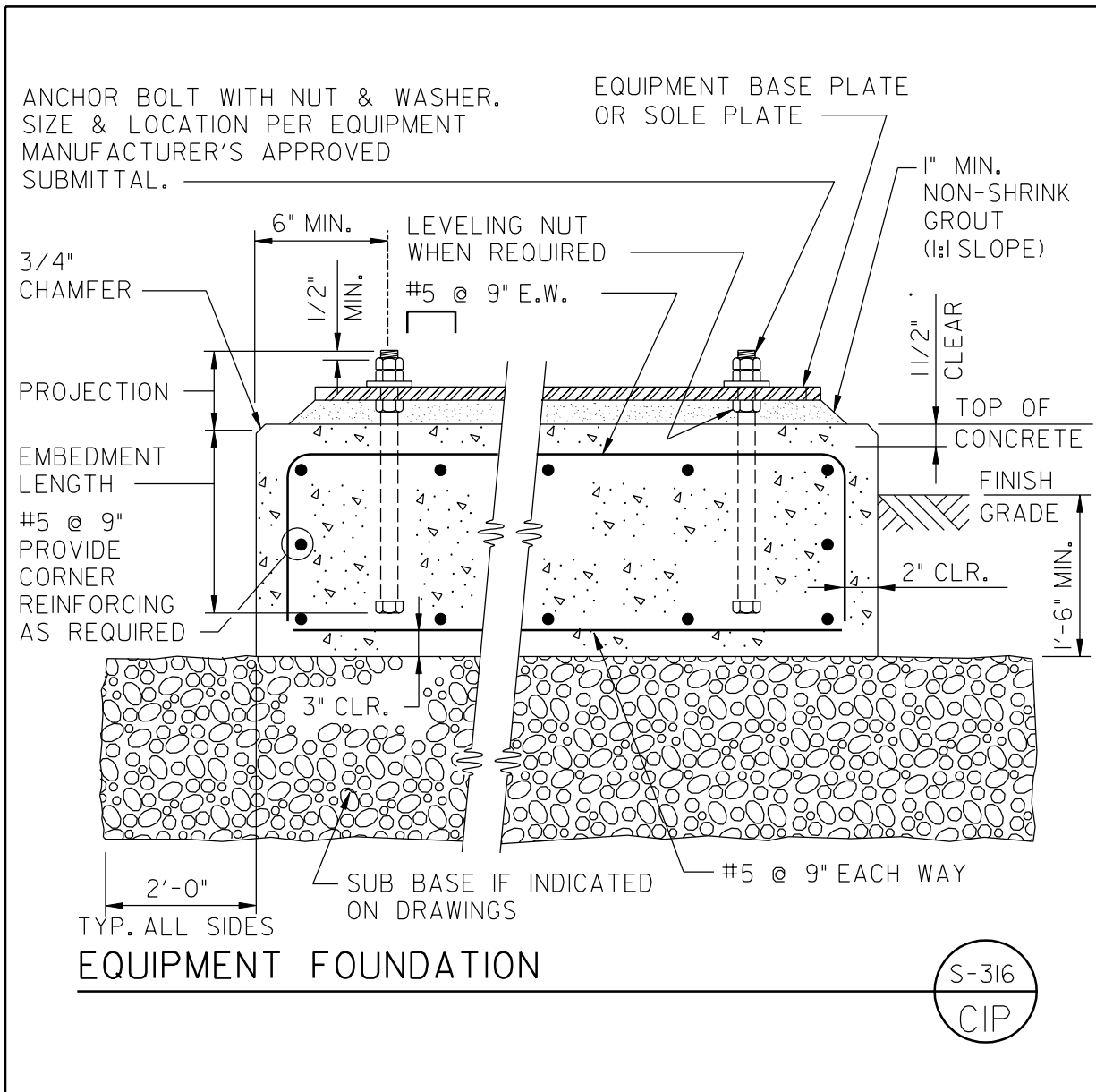


STANDARD  
DETAIL

CIP

**EQUIPMENT PEDESTAL**

S-315



**Notes to Design Consultant:**

1. This detail to be used for light equipment foundation.
2. Modify this detail, as required, for large, heavy equipment foundations. Reinforcing adequacy shall be verified.
3. Anchor bolt requirements shall be verified. Anchor bolt projection and embedment length shall be verified and adjusted to meet design requirements.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

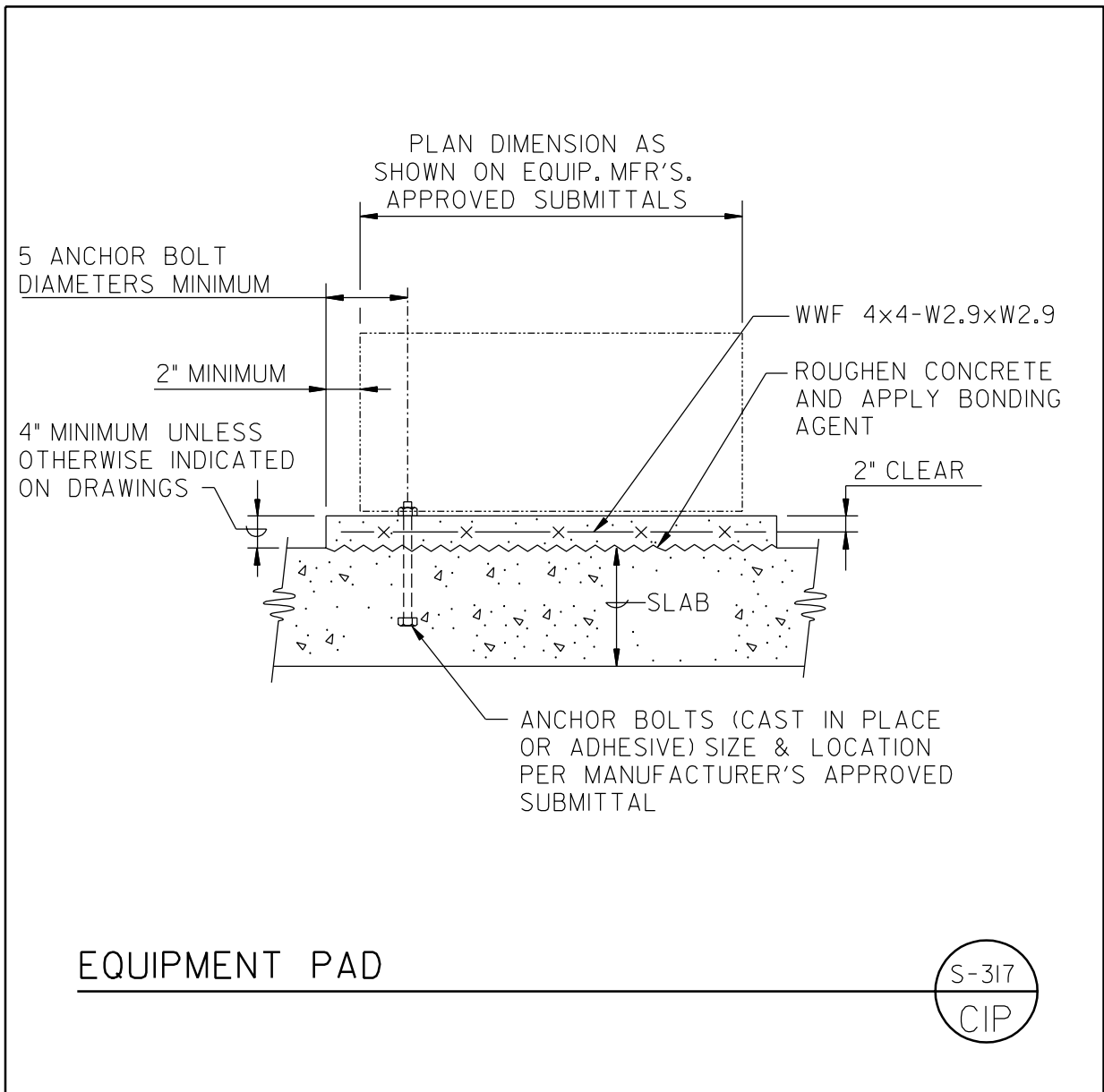


STANDARD  
DETAIL

CIP

**EQUIPMENT FOUNDATION**

S-316



Notes to Design Consultant:

1. This detail to be used under electrical MCC units, and other house keeping light equipment pad.
2. Provide height of pad on drawings.
3. This detail to be used only for equipment pad height  $\leq$  6".

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REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



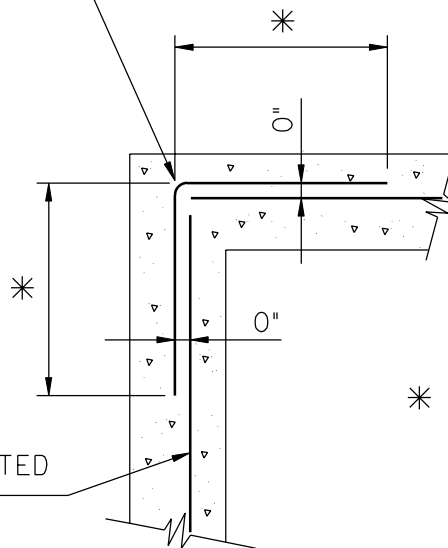
STANDARD  
DETAIL

CIP

**EQUIPMENT PAD**

S-317

ADDITIONAL CORNER REINFORCING  
SAME SIZE AND SPACING AS WALL  
REINFORCING UNLESS OTHERWISE  
INDICATED ON DRAWINGS



REINFORCING AS INDICATED  
ON DRAWINGS (TYP.)

\* TENSION LAP SPLICES  
PER GENERAL  
STRUCTURAL NOTES  
UNLESS OTHERWISE  
INDICATED ON DWGS.

# SINGLY REINFORCED WALL L-CORNER TYPE I

S-318

CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

SINGLY REINFORCED WALL  
L-CORNER TYPE I

S-318

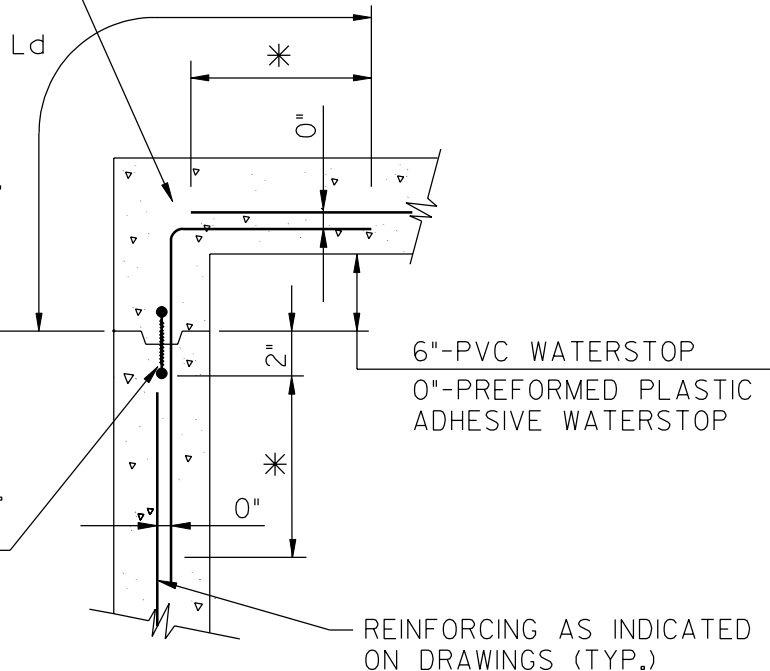
ADDITIONAL CORNER REINFORCING  
SAME SIZE AND SPACING AS WALL  
REINFORCING UNLESS OTHERWISE  
INDICATED ON DRAWINGS

\* TENSION LAP SPLICES  
PER GENERAL  
STRUCTURAL NOTES  
UNLESS OTHERWISE  
INDICATED ON DRAWINGS.

$L_d$ =DEVELOPMENT  
LENGTH PER GENERAL  
STRUCTURAL NOTES  
UNLESS OTHERWISE  
INDICATED ON DRAWINGS.

CONSTRUCTION JOINT  
AS INDICATED ON  
DRAWING

WATERSTOP WHERE  
INDICATED ON DRAWINGS.  
SEE STANDARD  
DETAIL S-313



## SINGLY REINFORCED WALL L-CORNER TYPE 2

S-319

CIP

### Notes to Design Consultant:

1. Use this detail if there is a vertical joint at the junction of the walls, and waterstop required.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

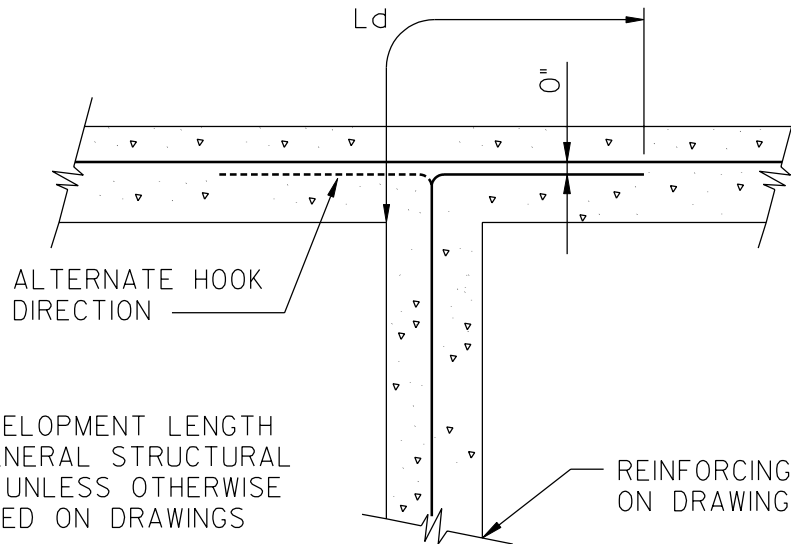


STANDARD  
DETAIL

CIP

SINGLY REINFORCED WALL  
L-CORNER TYPE 2

S-319



Ld=DEVELOPMENT LENGTH  
PER GENERAL STRUCTURAL  
NOTES UNLESS OTHERWISE  
INDICATED ON DRAWINGS

REINFORCING AS INDICATED  
ON DRAWINGS (TYP.)

# SINGLY REINFORCED WALL T-CORNER TYPE I



REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

**WATER DEPARTMENT**  
City of San Diego

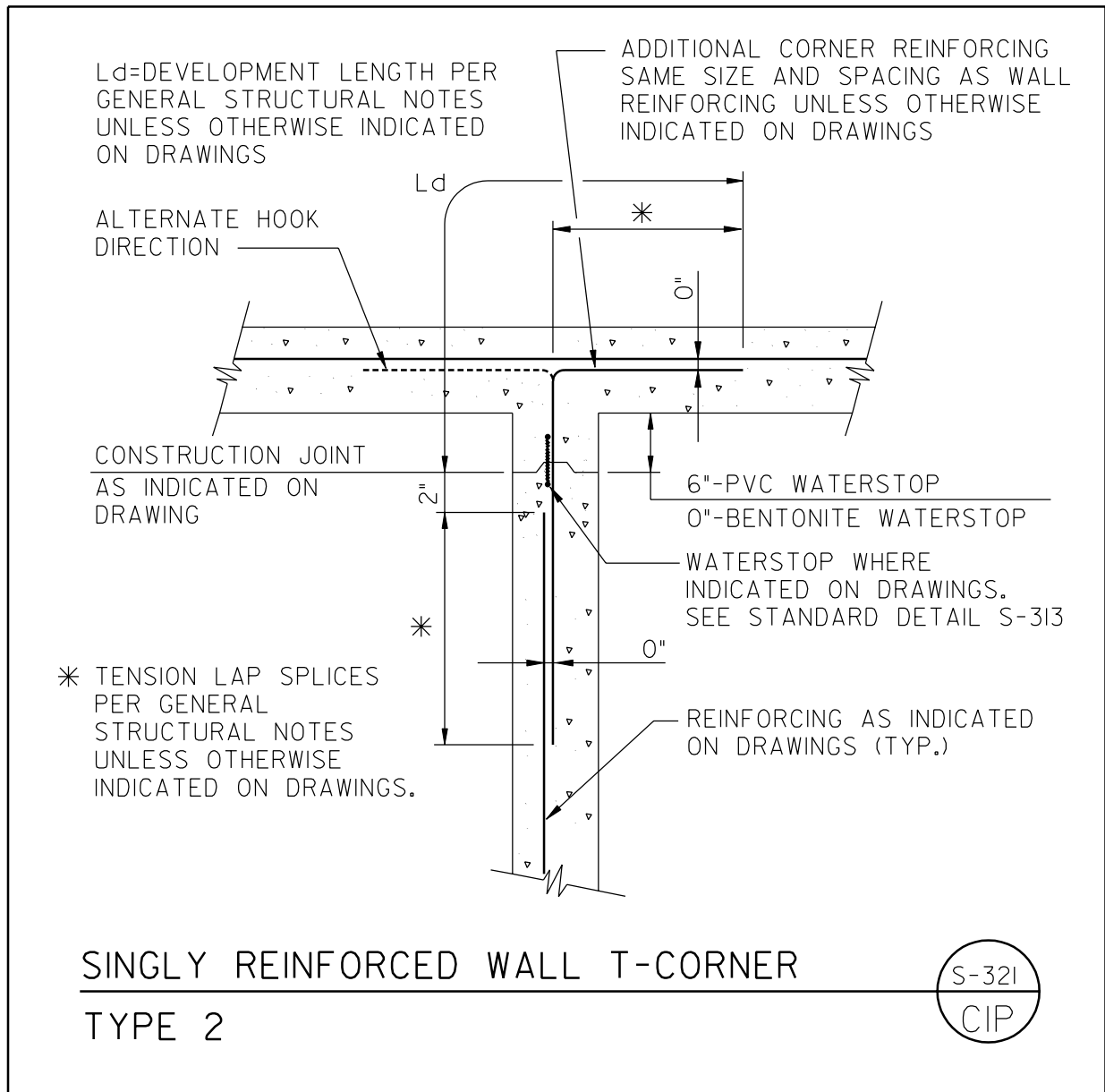


STANDARD  
DETAIL

CIP


SINGLY REINFORCED WALL  
T-CORNER TYPE I

S-320

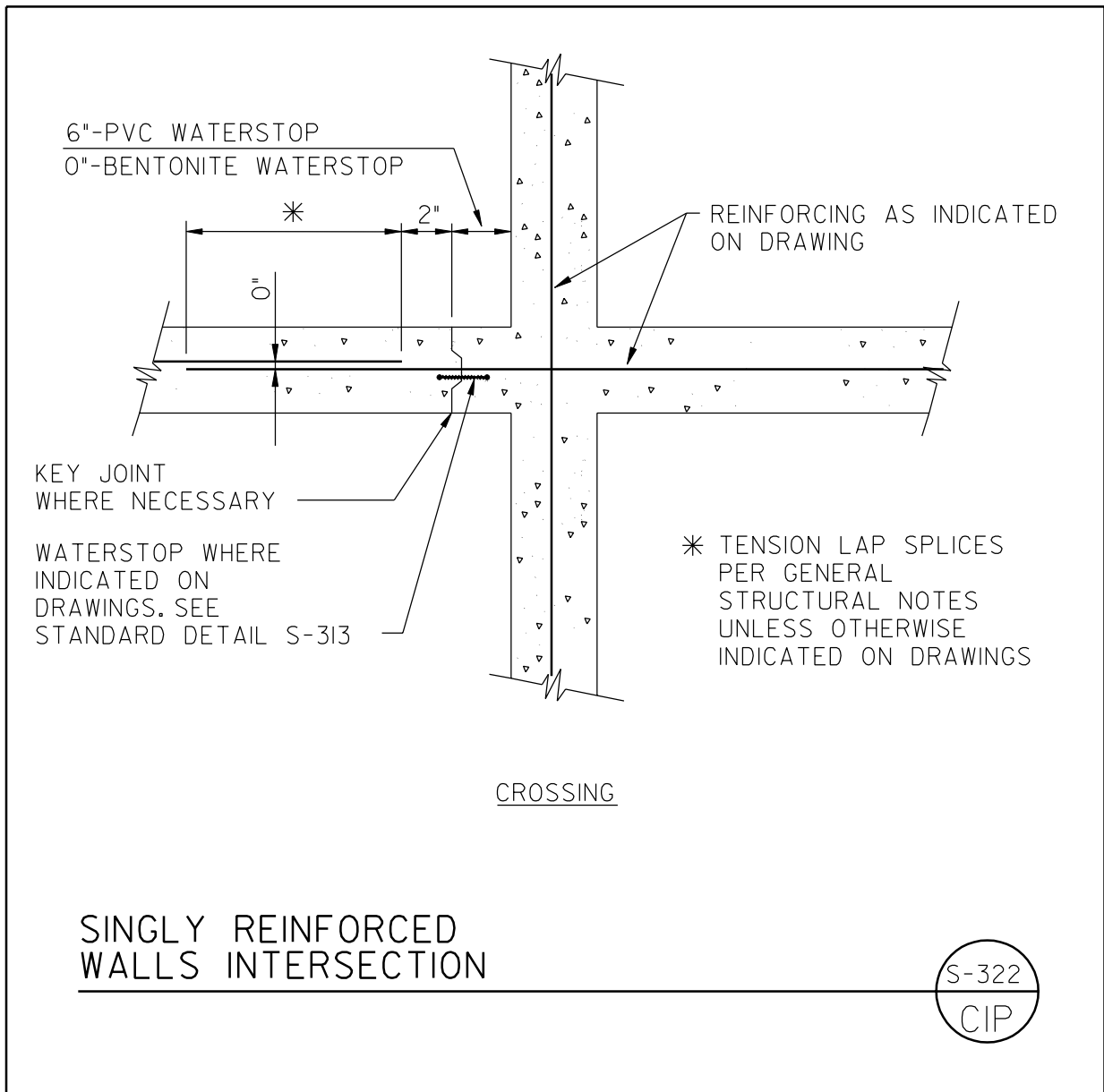


Notes to Design Consultant:

1. Use this detail if there is a vertical joint at the junction of the walls, and waterstop required.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE	<div>WATER DEPARTMENT</div> <div>City of San Diego</div> <div></div>	STANDARD DETAIL
					CIP
REVIEWED BY	INITIALS	DATE		<div>SINGLY REINFORCED WALL</div> <div>T-CORNER TYPE 2</div>	S-321





Notes to Design Consultant: \_\_\_\_\_

1. Use this detail if there is a vertical joint in any of the walls at the junction.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

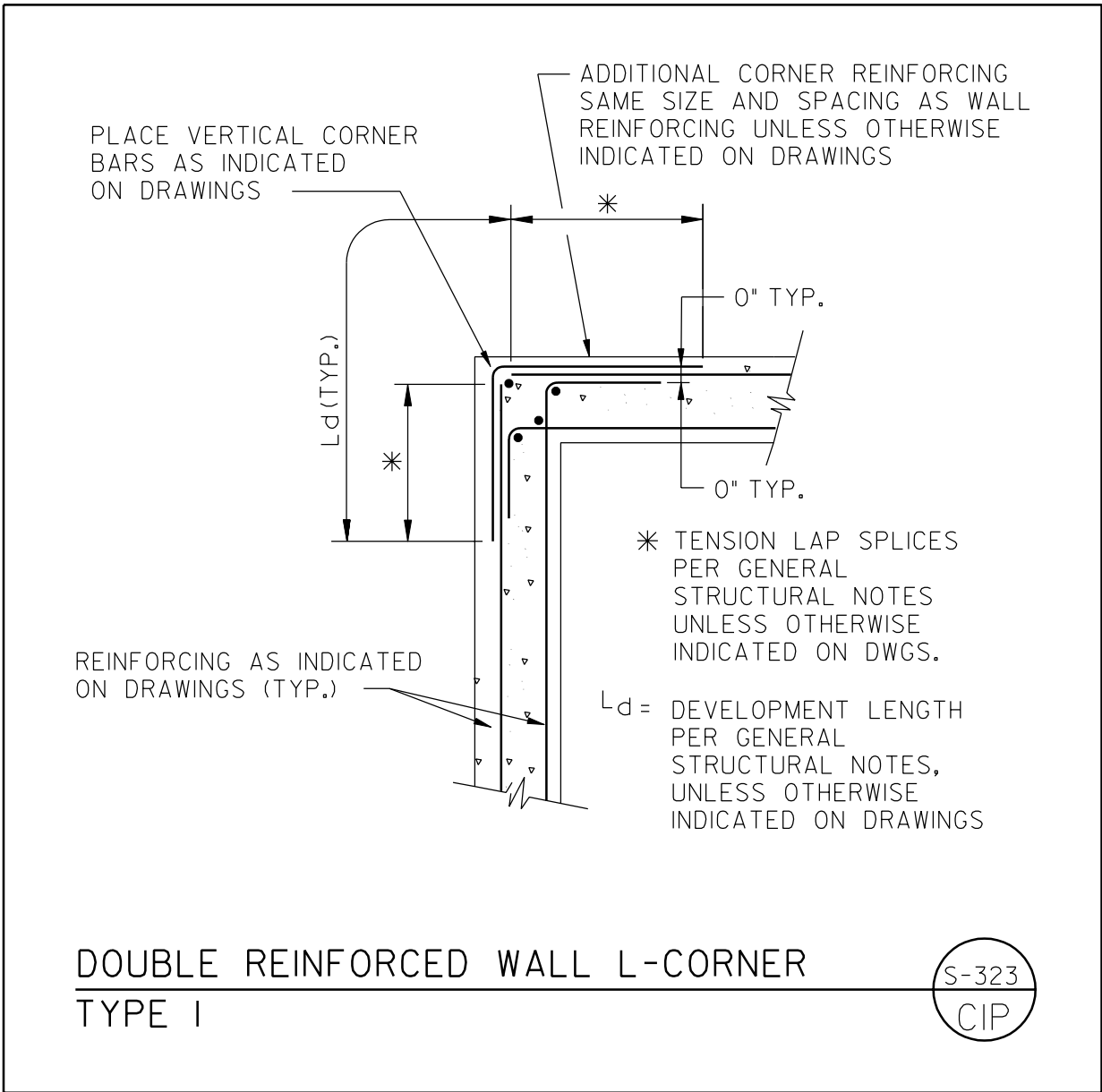


STANDARD  
DETAIL

CIP

**SINGLY REINFORCED  
WALLS INTERSECTION**

S-322



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

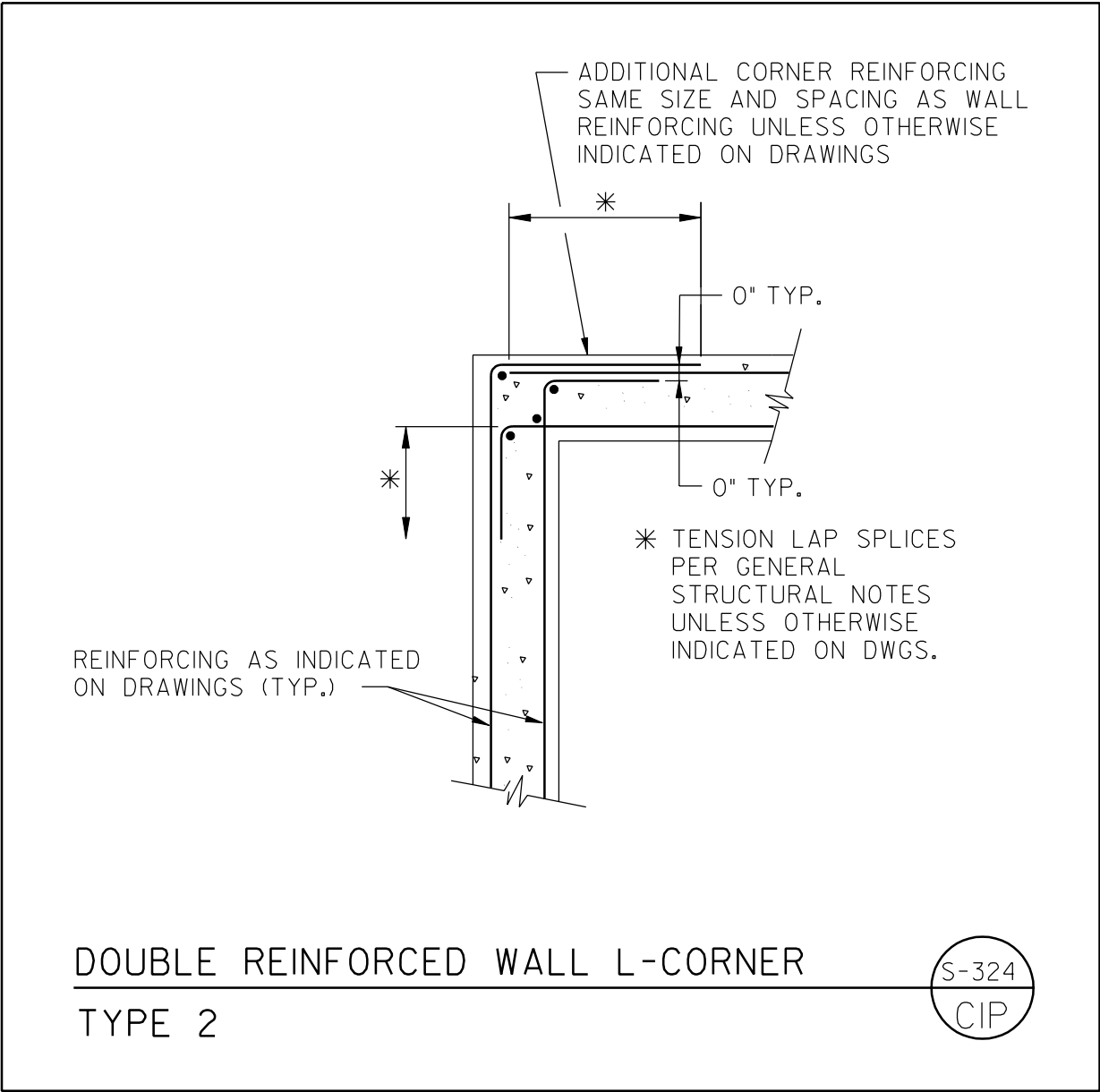


STANDARD  
DETAIL

CIP

**DOUBLE REINFORCED WALL  
L-CORNER TYPE I**

**S-323**



S-324  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

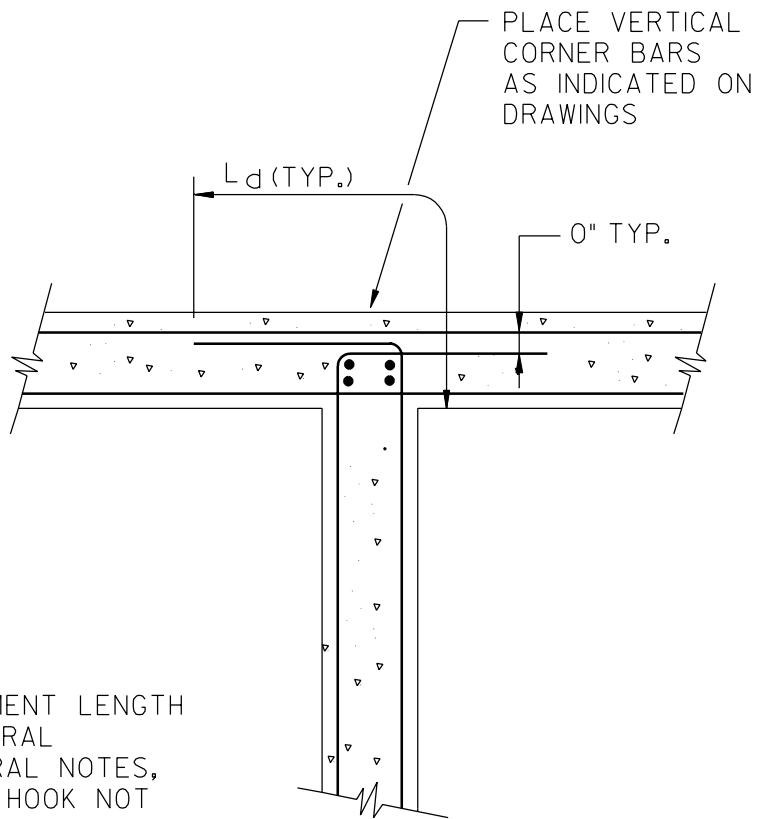


STANDARD  
DETAIL

CIP

S-324

DOUBLE REINFORCED WALL  
L-CORNER TYPE 2



$L_d$  = DEVELOPMENT LENGTH  
PER GENERAL  
STRUCTURAL NOTES,  
BUT 90° HOOK NOT  
LESS THAN STANDARD.

T-CORNER

DOUBLE REINFORCED WALL T-CORNER  
TYPE I



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



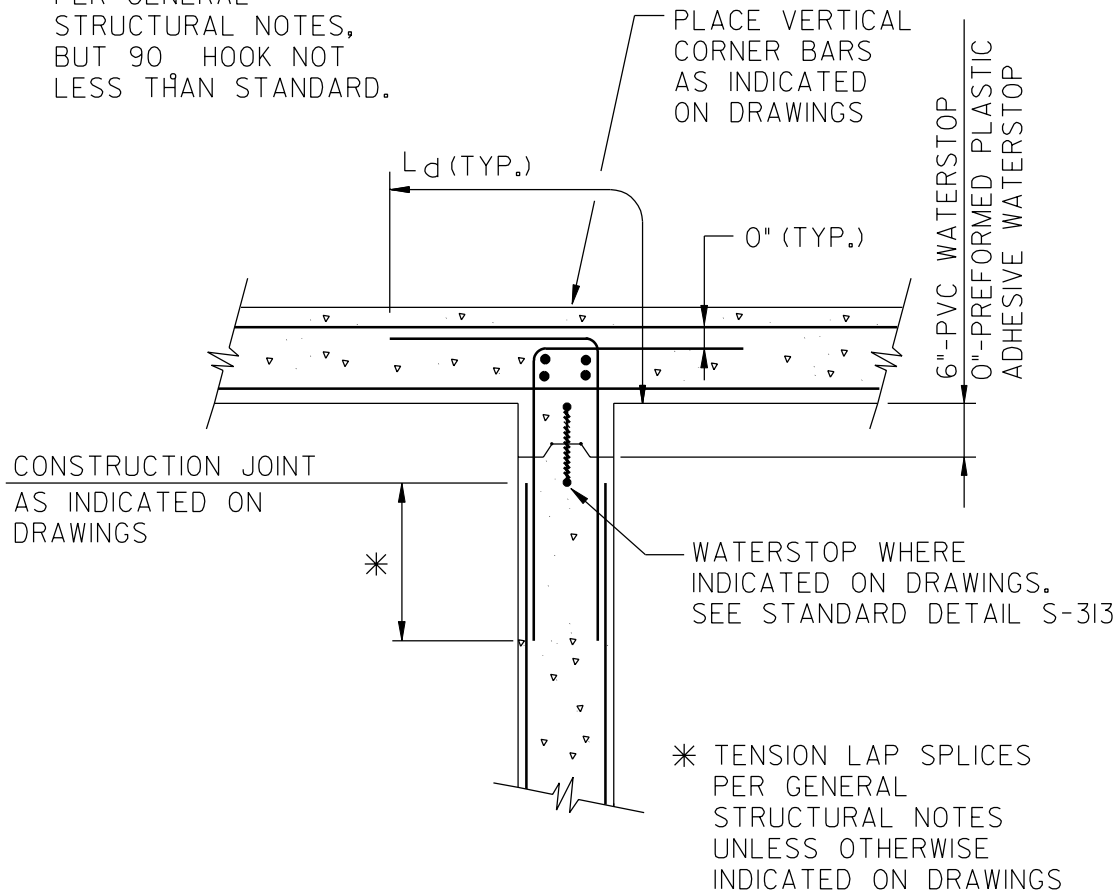
**DOUBLE REINFORCED WALL**  
T-CORNER TYPE I

STANDARD  
DETAIL

CIP

S-325

$L_d$  = DEVELOPMENT LENGTH  
PER GENERAL  
STRUCTURAL NOTES,  
BUT 90° HOOK NOT  
LESS THAN STANDARD.



## DOUBLE REINFORCED WALL T-CORNER TYPE 2

S-326

CIP

### Notes to Design Consultant:

1. Use this detail if there is a vertical joint at the junction of the walls, and waterstop required.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

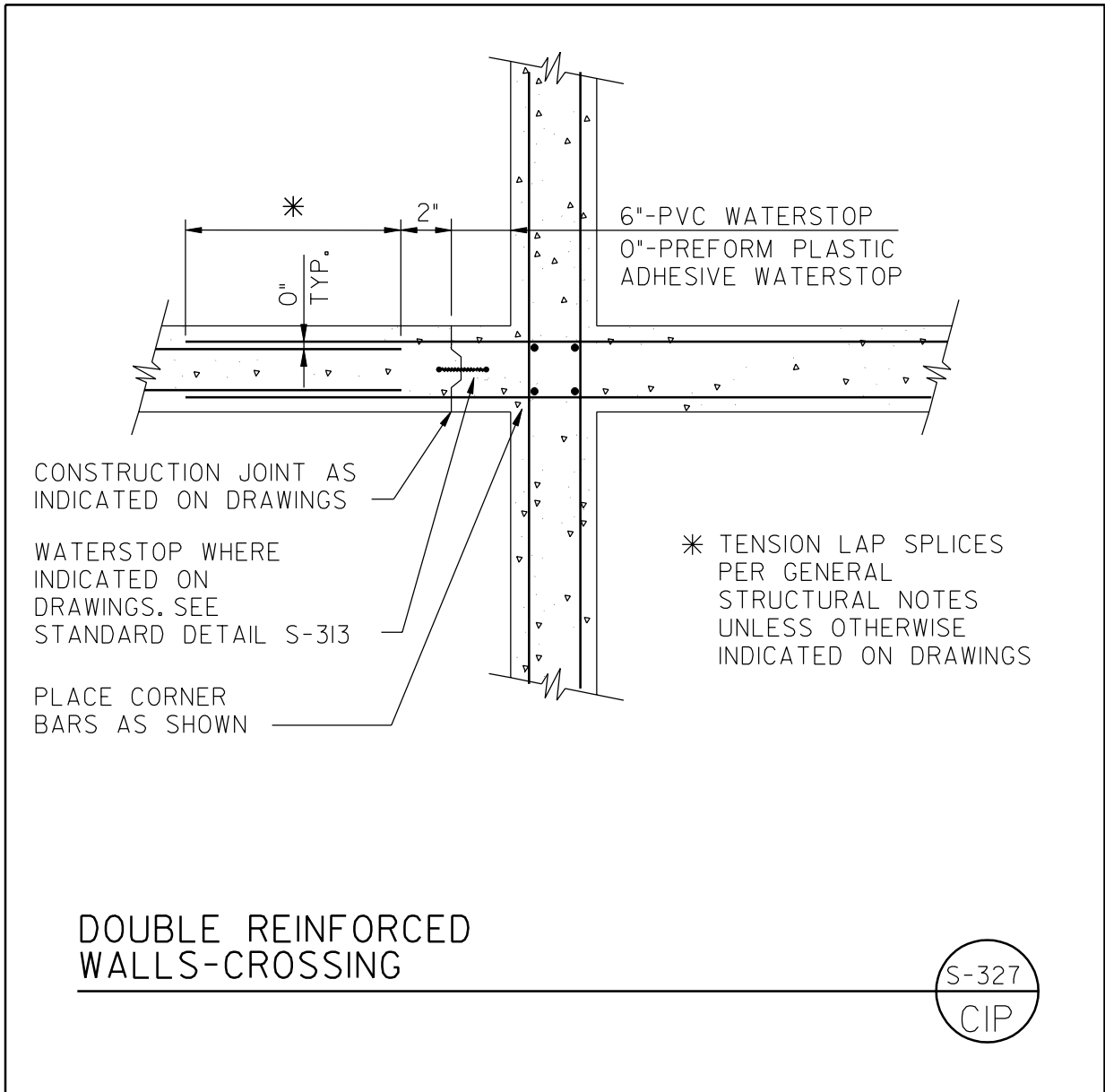


STANDARD  
DETAIL

CIP

**DOUBLE REINFORCED WALL  
T-CORNER TYPE 2**

S-326



Notes to Design Consultant:

1. Use this detail if there is a vertical joint in any of the walls at the junction.
2. The specifications shall fully describe the waterstop.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

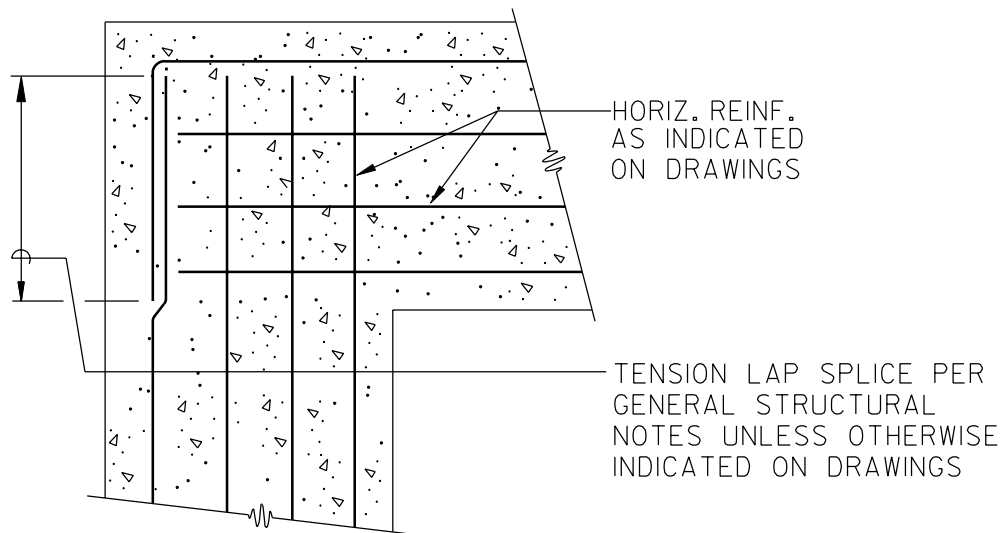


**DOUBLE REINFORCED WALLS-CROSSING**

STANDARD  
DETAIL

CIP

S-327



NOTE:  
ONLY HORIZ. REINF. SHOWN

## FOUNDATION STRIP FOOTING L INTERSECTION

S-328

CIP

REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego



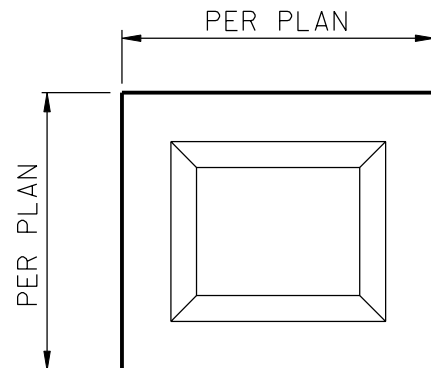
STANDARD  
DETAIL

CIP

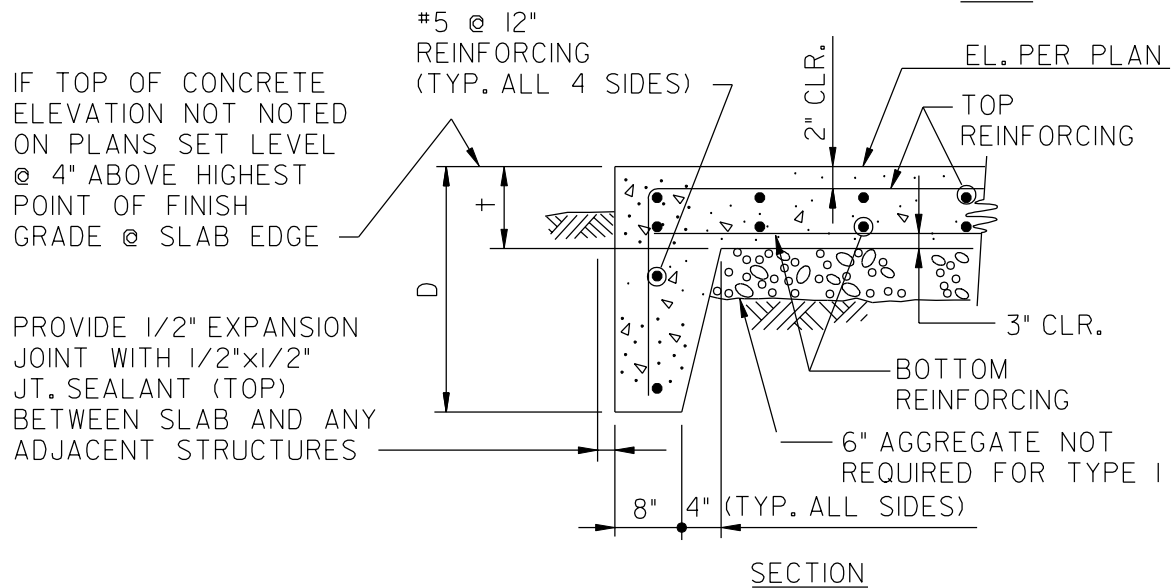
**FOUNDATION STRIP FOOTING  
L INTERSECTION**

S-328

SLAB TYPE	D	+	TOP REINF. E.W.	BOTTOM REINF. E.W.
1	1'-0"	6"	#4 @ 12"	-
2	1'-6"	8"	#5 @ 12"	-
3	2'-0"	12"	#5 @ 12"	#5 @ 12"



PLAN



SECTION

## SLAB-ON-GRADE



### Note to Design Consultant

1. Use Type 1 for foot traffic, Type 2 for light vehicular and Type 3 for heavy vehicular traffic.

REVISION	BY	APPROVED	DATE
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WATER DEPARTMENT  
City of San Diego



STANDARD  
DETAIL

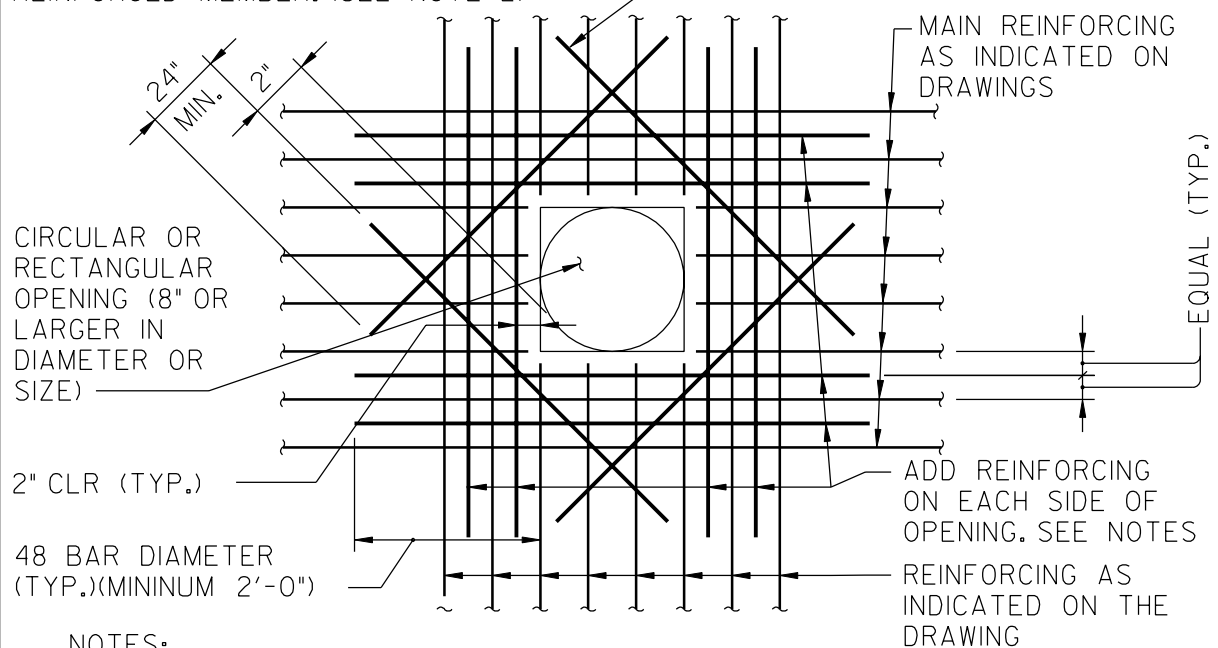
CIP

SLAB-ON-GRADE

S-329



PROVIDE 1-#5 AT CENTER OF WALL OR SLAB FOR SINGLE REINFORCED MEMBER. (SEE NOTE 2)  
 PROVIDE 1-#5 EACH FACE OF WALL OR SLAB FOR DOUBLY REINFORCED MEMBER. (SEE NOTE 2)



NOTES:

1. AREA OF ADDED REINFORCING AT EACH EDGE OF OPENING IN EACH DIRECTION SHALL BE AT LEAST  $\frac{1}{2}$  THE CROSS SECTIONAL AREA OF THE INTERRUPTED REINFORCING.
2. PROVIDE STANDARD HOOKS ON REINFORCING IF STRAIGHT EXTENSION PAST THE OPENING CANNOT BE OBTAINED.
3. PLACE ADDED REINFORCING IN SAME PLANES AS MAIN REINFORCING.

**OPENING REINFORCEMENT**



REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
 City of San Diego

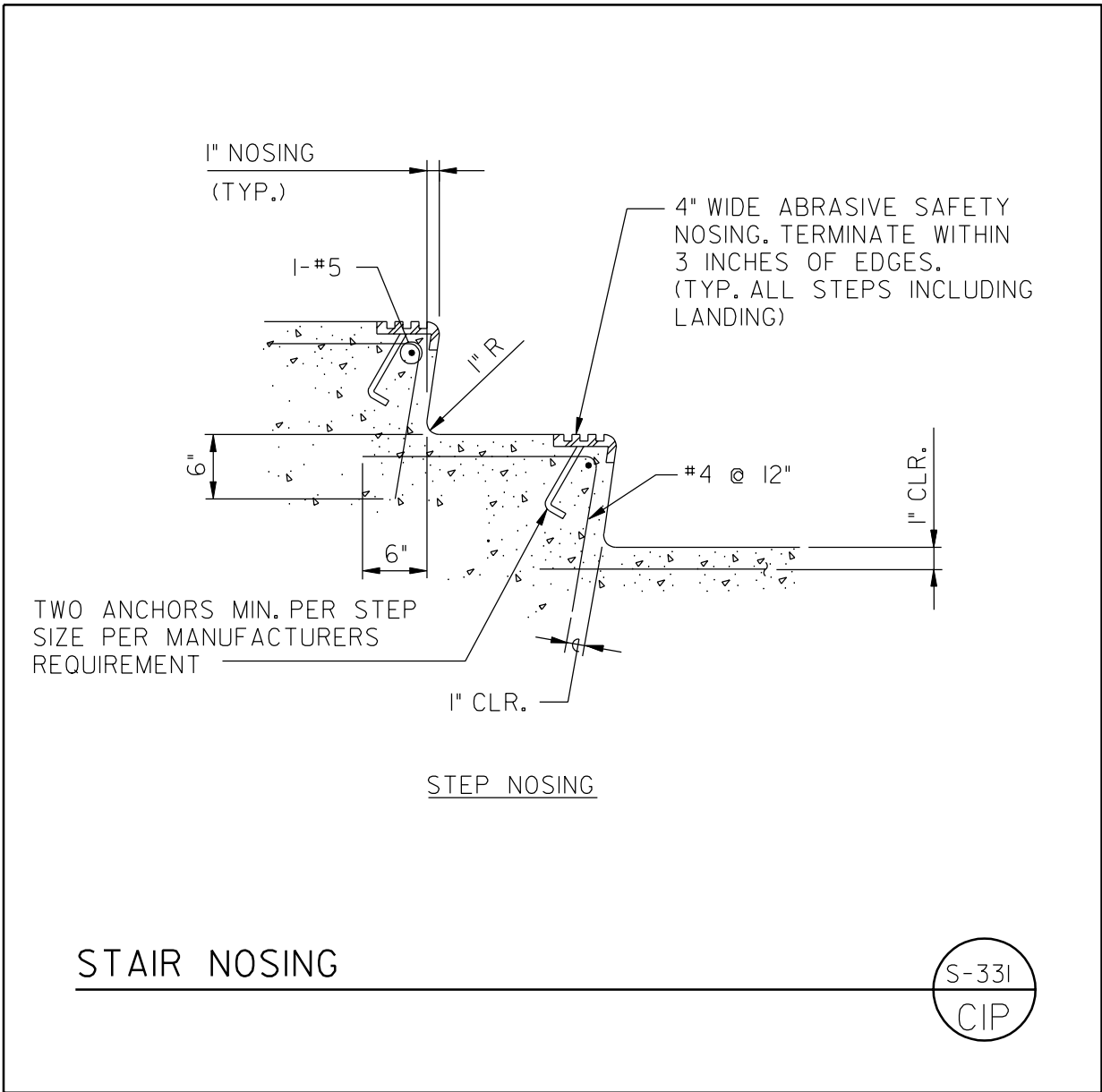


**OPENING REINFORCEMENT**

STANDARD  
 DETAIL

CIP

S-330



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

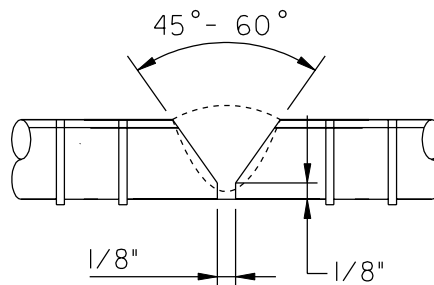


STANDARD  
DETAIL

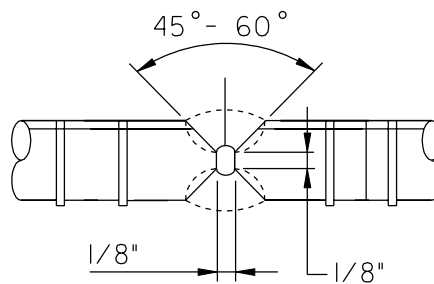
CIP

STAIR NOSING

S-331



SINGLE - V- GROOVE WELD



DOUBLE - V- GROOVE WELD

NOTES:

1. WELDING PROCEDURES SHALL BE PER AWS D1.4 REQUIREMENT.
2. USE E-80 ELECTRODE FOR GRADE 60 AND E-70 FOR GRADE 40 BARS.


DIRECT BUTT-WELDED SPLICES  
HORIZONTAL REINFORCING BARS

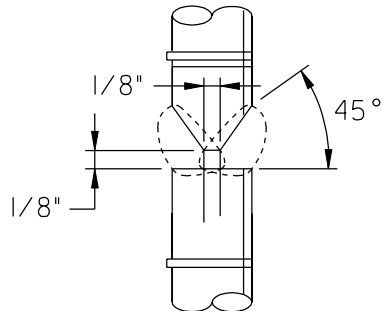


Note to Design Consultant

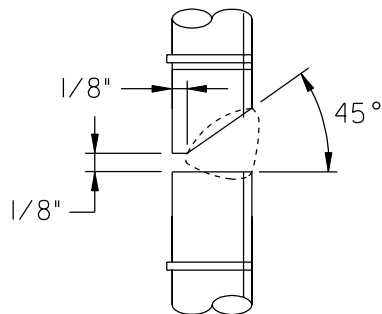
Welding of rebar is not allowed except when approved by engineer.

REVISION	BY	APPROVED	DATE

<p align="center"><b>WATER DEPARTMENT</b> City of San Diego</p> 		STANDARD DETAIL
		CIP
<p align="center"><b>DIRECT BUTT-WELD SPLICES HORIZONTAL REINFORCING BARS</b></p>		S-332



DOUBLE - BEVEL - GROOVE WELD



SINGLE - BEVEL - GROOVE WELD

NOTES:


1. WELDING PROCEDURES SHALL BE PER AWS D1.4 REQUIREMENT.
2. USE E980 ELECTRIDE FOR GRADE 60 AND E70 FOR GRADE 40 BARS.

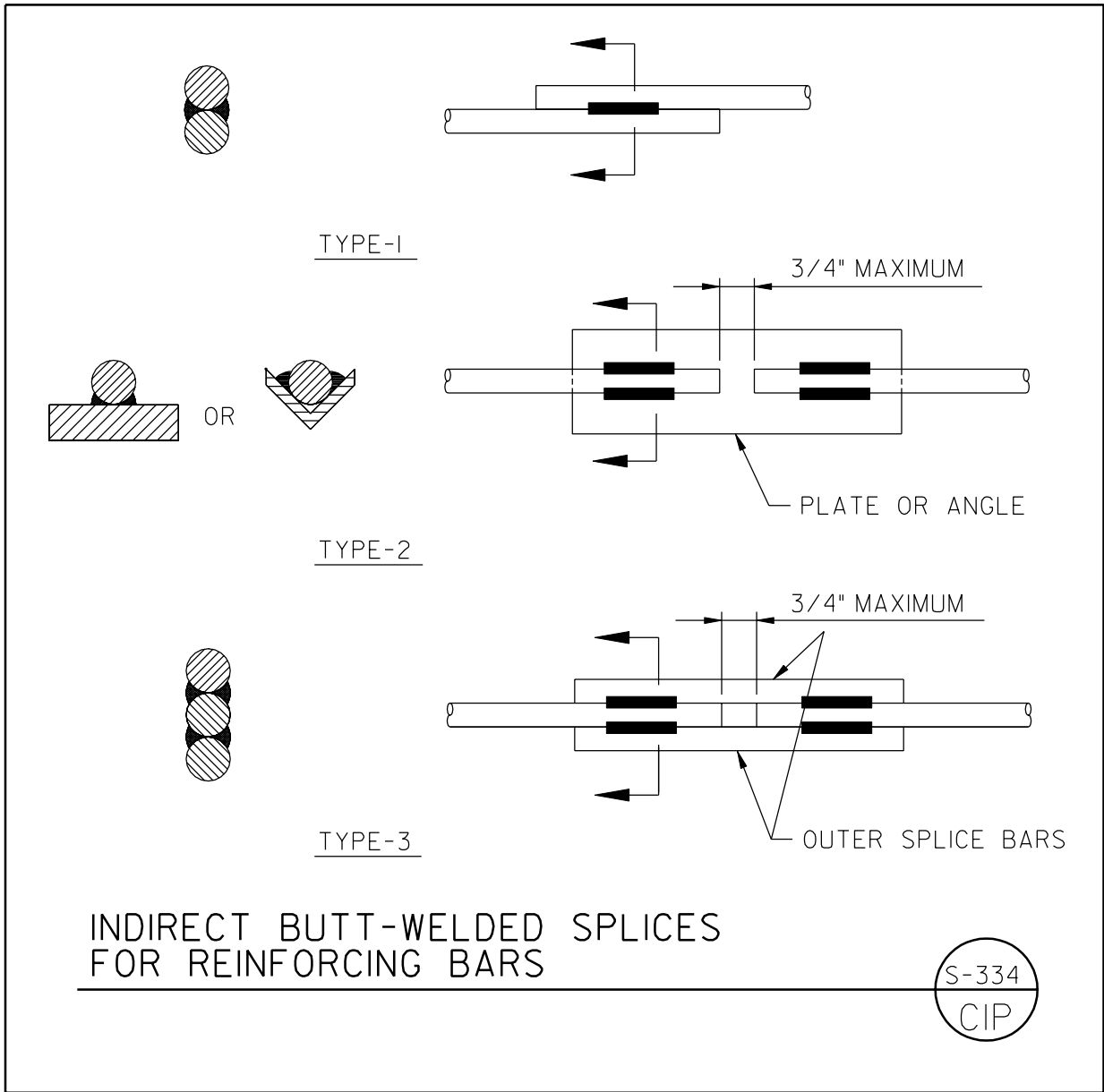
DIRECT BUTT-WELDED SPLICES  
VERTICAL REINFORCING BARS



Note to Design Consultant

Welding rebar are not allowed except when approved by engineer.

REVISION	BY	APPROVED	DATE	<b>WATER DEPARTMENT</b> City of San Diego		 STANDARD DETAIL
				<b>DIRECT BUTT-WELD SPLICES</b> <b>VERTICAL REINFORCING BARS</b>		CIP
						S-333
REVIEWED BY	INITIALS	DATE				



Note to Design Consultant

Welding rebar are not allowed except when approved by engineer.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

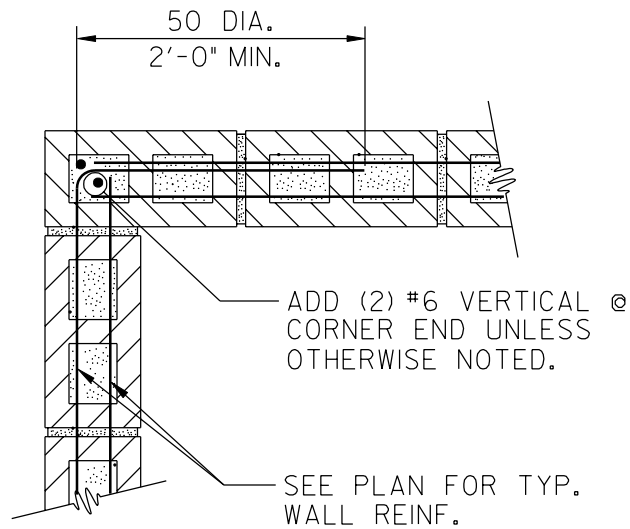


STANDARD  
DETAIL

CIP

**INDIRECT BUTT-WELD SPLICES  
FOR REINFORCING BARS**

S-334



VERTICAL REINFORCING NOT SHOWN  
FOR CLARITY

NOTE:  
ALL EXTERIOR JOINTS TO BE RAKED  
AND INTERIOR JOINTS TO BE TOOLED  
SEE PROJECT SPECIFICATIONS.

## MASONRY WALL L-CORNER

S-335  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

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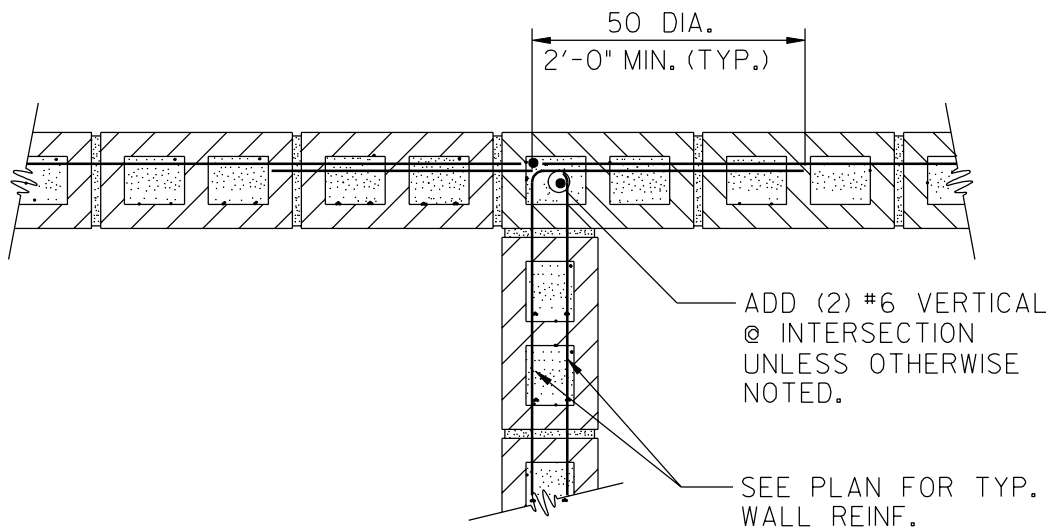


STANDARD  
DETAIL

CIP

MASONRY WALL L-CORNER

S-335



NOTE:  
ALL EXTERIOR JOINTS TO BE RAKED  
AND INTERIOR JOINTS TO BE TOOLED  
SEE PROJECT SPECIFICATIONS

## MASONRY WALL T-CORNER

S-336  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

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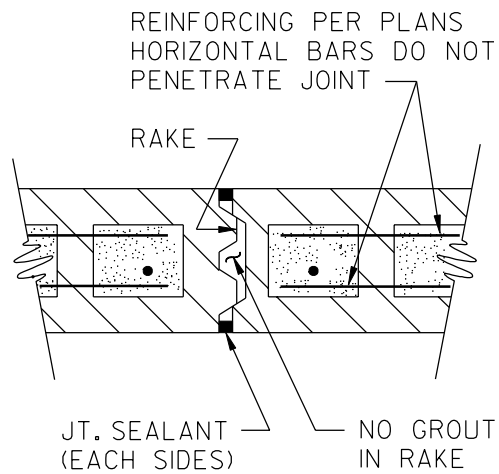


STANDARD  
DETAIL

CIP

MASONRY WALL T-CORNER

S-336



## MASONRY WALL CONTROL JOINT

S-337  
CIP

Note to Consultant: \_\_\_\_\_

1. Locate control joint at 20' + o/c.

REVISION	BY	APPROVED	DATE
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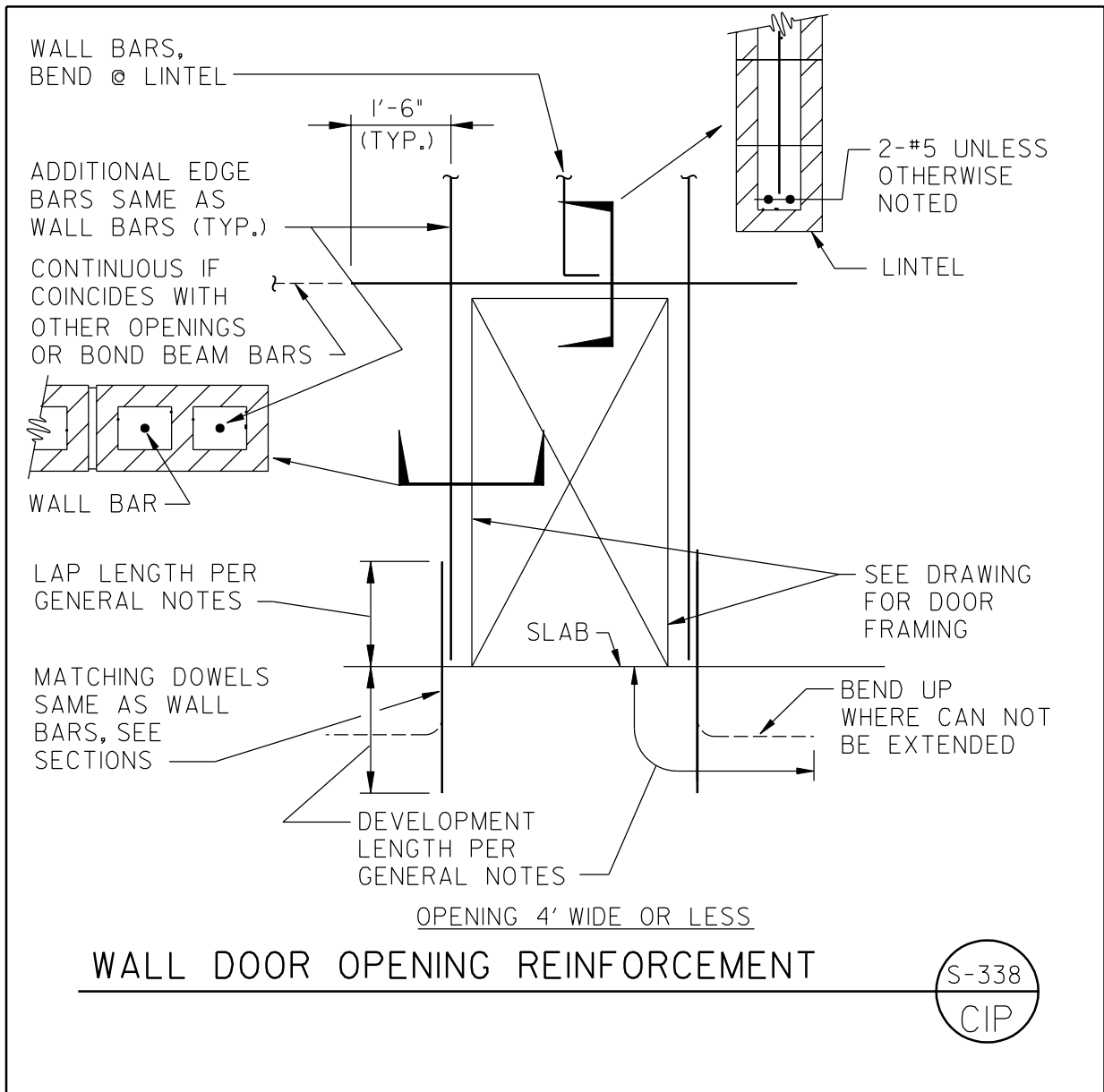
STANDARD  
DETAIL

CIP

MASONRY WALL CONTROL JOINT

S-337





Note to Consultant

1. Verify reinforcement for design loading.
2. Provide reinforcing details for opening wider than 4'-0".

REVISION	BY	APPROVED	DATE
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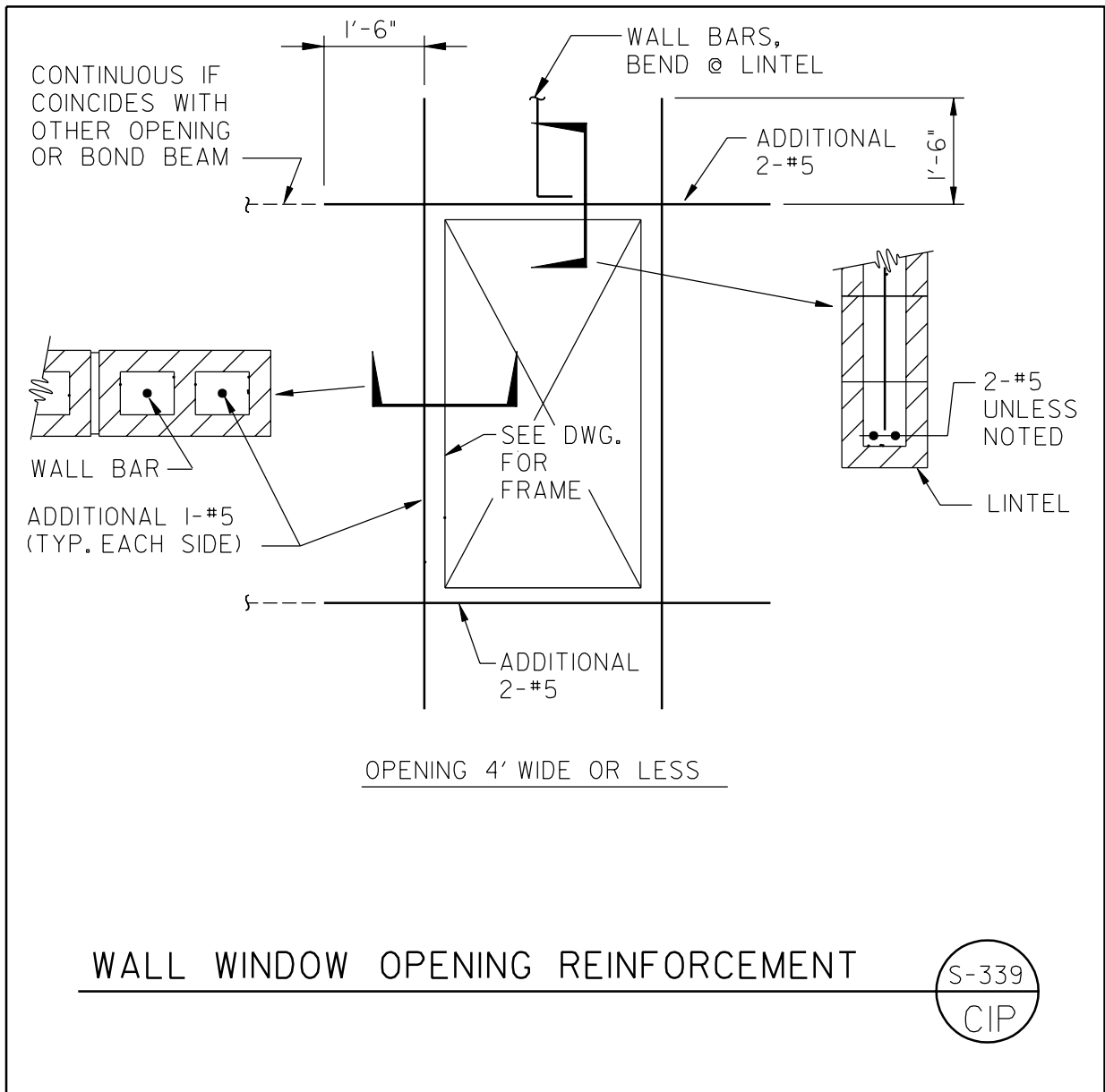


**WALL DOOR OPENING  
REINFORCEMENT**

STANDARD  
DETAIL

CIP

S-338



Notes to Consultant

1. Verify reinforcement for design loading.
2. Provide reinforcing details for opening wider than 4'-0".
3. Additional reinforcement not required for opening smaller than 16" x 16".

REVISION	BY	APPROVED	DATE
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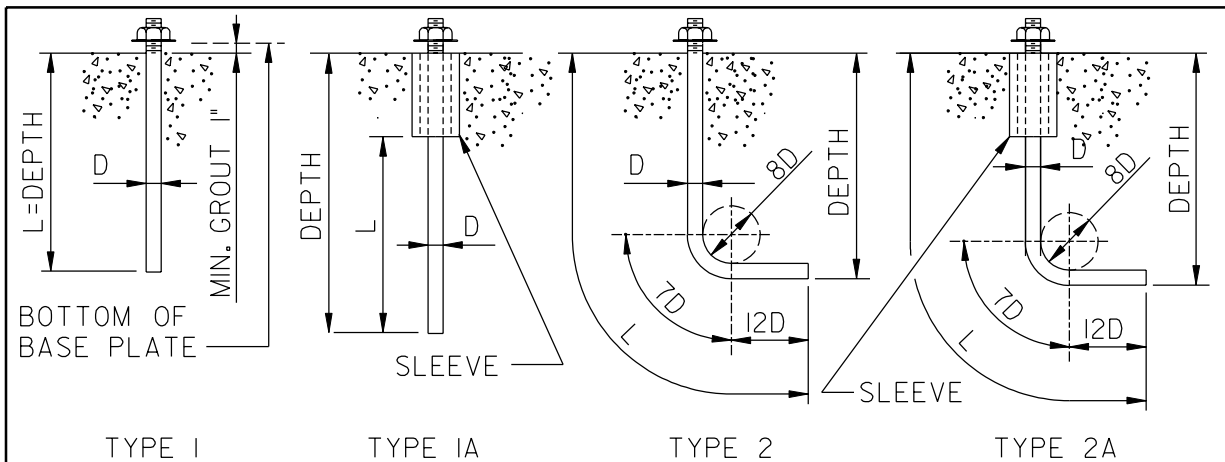


STANDARD  
DETAIL

CIP

**WALL WINDOW OPENING  
REINFORCEMENT**

S-339



BOLT DIAMETER, D, in.		1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
ALLOWABLE KIPS	TENSION	3.9	6.1	8.8	12.0	15.7	19.9	24.5	29.7	35.3
	SHEAR	2.0	3.1	4.4	6.0	7.9	9.9	12.3	14.8	17.7
REQ'D EMBEDMENT LENGTH, L		1'-4"	1'-8"	2'-0"	2'-4"	2'-10"	3'-6"	4'-4"	5'-3"	6'-4"
TYPE 1	DEPTH	1'-4"	1'-8"	2'-0"	2'-4"	2'-10"	3'-6"	4'-4"	5'-3"	6'-4"
TYPE 1A	SLEEVE	2" DIA. x6"	2" DIA. x6"	2" DIA. x8"	2" DIA. x8"	2 1/2" DIA. x12"	2 1/2" DIA. x12"	3" DIA. x15"	3" DIA. x15"	3 1/2" DIA. x15"
	DEPTH	1'-10"	2'-2"	2'-8"	3'-0"	3'-10"	4'-6"	5'-7"	6'-6"	7'-7"
TYPE 2	DEPTH	0'-9"	0'-11 1/4"	1'-1 1/2"	1'-3 3/4"	1'-8"	2'-2 1/4"	2'-10 1/2"	3'-7 3/4"	4'-8"
TYPE 2A	SLEEVE	2" DIA. x6"	2" DIA. x6"	2" DIA. x8"	2" DIA. x8"	2 1/2" DIA. x12"	2 1/2" DIA. x12"	3" DIA. x15"	3" DIA. x15"	3 1/2" DIA. x15"
	DEPTH	1'-3"	1'-5 1/4"	1'-9 1/2"	1'-11 3/4"	2'-8"	3'-2 1/4"	4'-1 1/2"	4'-10 3/4"	5'-11"

## ANCHOR BOLTS AND SCHEDULE

### MATERIAL

ANCHOR BOLTS - ASTM A307 GRADE A OR A36  
 CONCRETE STRENGTH -  $f'_c = 4000$  PSI

S-340

CIP

### Note to Consultant

1. Tension and shear capacity based on normal anchor bolt spacing, minimum concrete reinforcement and 4000 PSI concrete.
2. Allowables based on tensile stress of 20 KSI and shear stress of 10 KSI on gross area.

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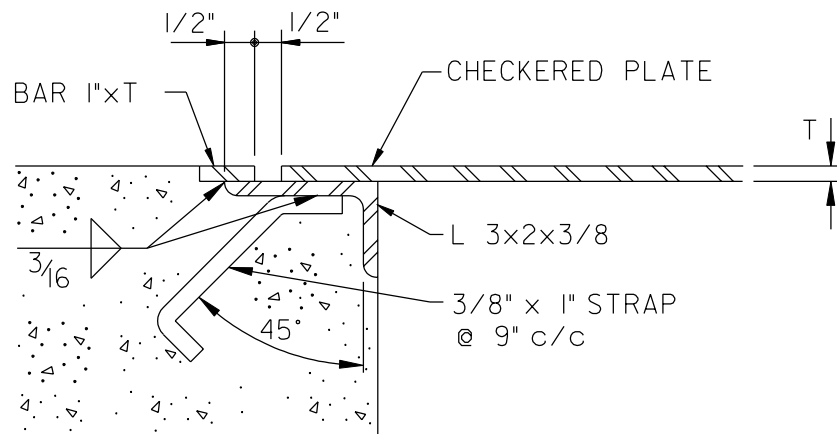


STANDARD  
DETAIL

CIP

ANCHOR BOLTS AND SCHEDULE

S-340



## CHECKERED PLATE SUPPORT AT FLOOR

S-341

CIP

### Notes to Consultant:

1. Specify material on drawings.
2. Indicate required thickness on drawings.

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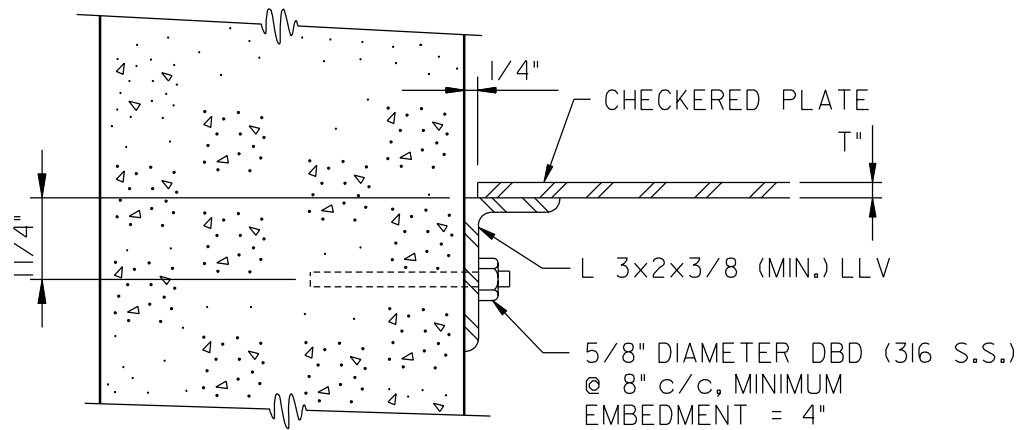


STANDARD  
DETAIL

CIP

**CHECKERED PLATE SUPPORT  
AT FLOOR**

S-341



## CHECKERED PLATE SUPPORT AT WALL

S-342

CIP

Notes to Consultant: \_\_\_\_\_

1. Specify material on drawings.
2. Indicate required thickness on drawings.

REVISION	BY	APPROVED	DATE
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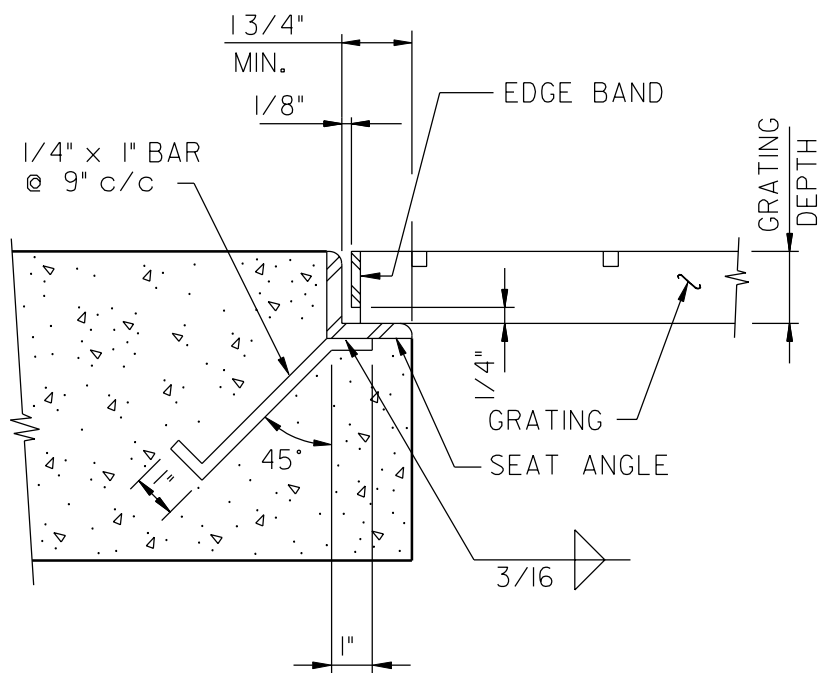


STANDARD  
DETAIL

CIP

**CHECKERED PLATE SUPPORT  
AT WALL**

S-342



## GRATING SUPPORT AT FLOOR

S-343

CIP

Notes to Consultant:

1. Specify material on drawings.
2. Indicate required depth on drawings.
3. Indicate minimum seat angle size on drawings.

REVISION	BY	APPROVED	DATE
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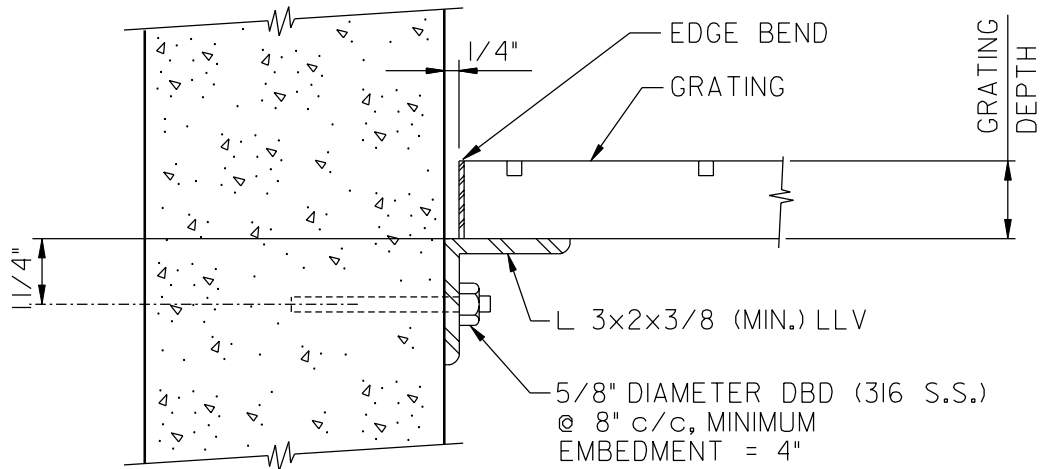


STANDARD  
DETAIL

CIP

GRATING SUPPORT AT FLOOR

S-343



## GRATING SUPPORT AT WALL

S-344

CIP

Notes to Consutant: \_\_\_\_\_

1. Specifiy material on drawings.
2. Indicate required depth on drawings.
3. Indicate minimum seat angle and bolt spacing size on drawings.

REVISION	BY	APPROVED	DATE
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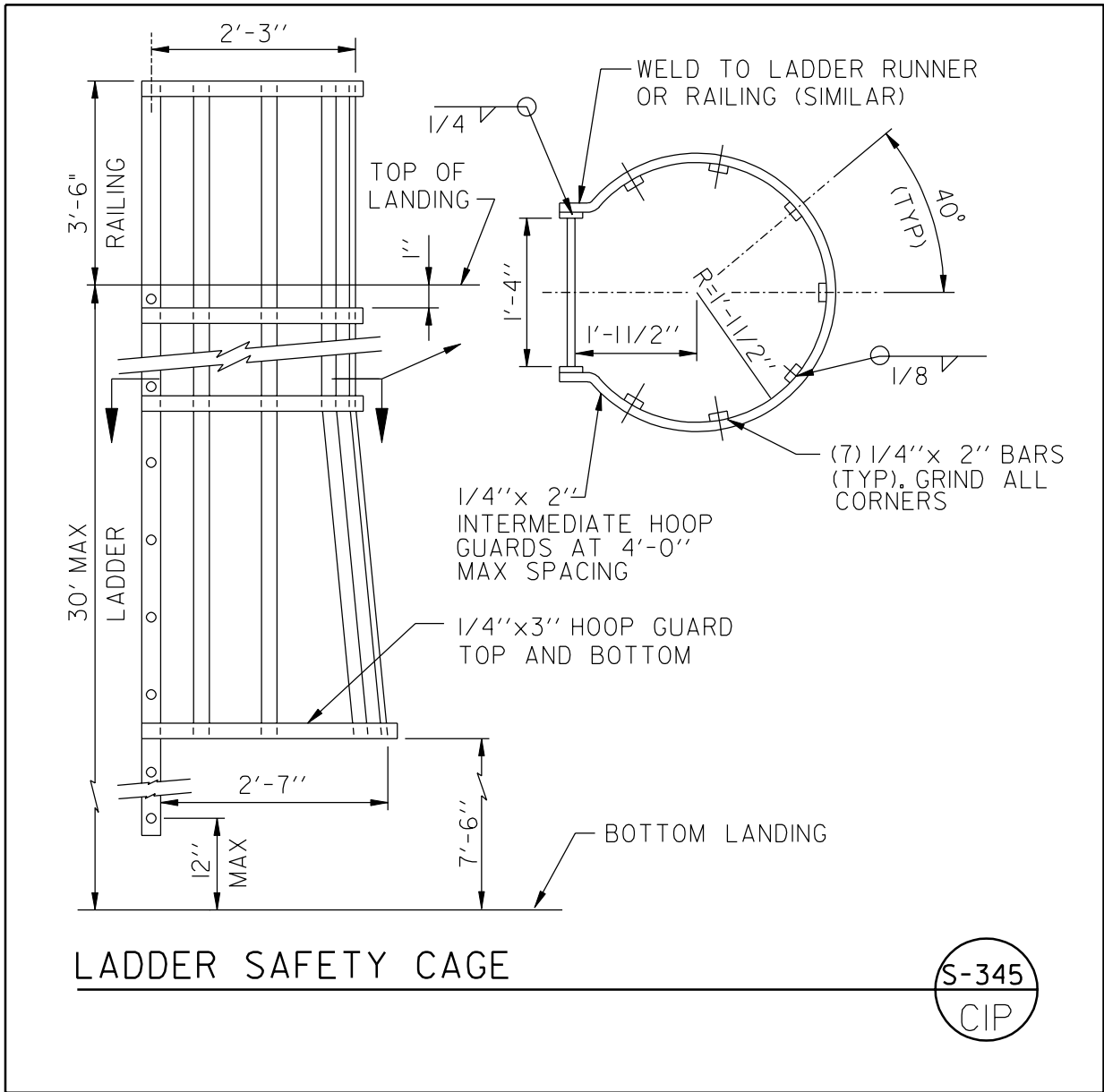


STANDARD  
DETAIL

CIP

GRATING SUPPORT AT WALL

S-344



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

**LADDER SAFETY CAGE**

S-345

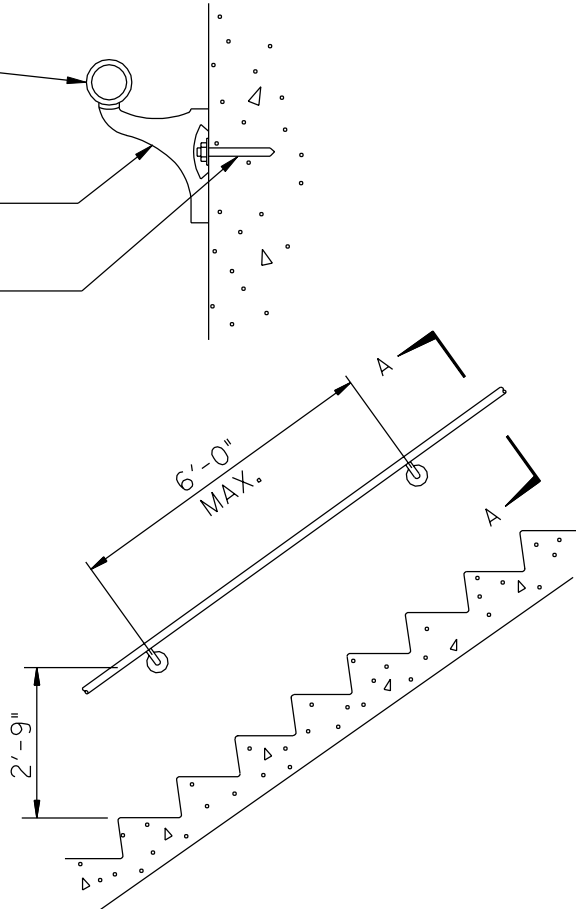


1 1/4" DIA.  
PIPE HANDRAIL

BRACKET SUPPORT

1/2" DIA. (316 S.S.) DBD  
MIN. EMBEDMENT = 4"

SECTION A-A



WALL MOUNTED HANDRAIL

S-346  
CIP

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REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

**WALL MOUNTED HANDRAIL**

S-346

FOR HANGER RODS  
3/4" DIA AND SMALLER

(4) #4 BAR, 3'-0" LONG  
UNIVERSAL CONCRETE  
INSERT GRINNELL FIG 282  
OR EQUAL

LOCK-NUT AND WASHER  
LINKED EYE ROD

ADJUSTABLE CLEVIS FOR STEEL  
PIPE, GRINNELL FIG 260  
OR EQUAL

ADJUSTABLE CLEVIS FOR CAST  
IRON PIPE, GRINNELL FIG 590  
OR EQUAL

ADJUSTABLE STEEL RING  
HANGER, GRINNELL FIG 269  
OR EQUAL. WHEN USED WITH  
PVC OR FIBERGLASS PIPE,  
PROVIDE STEEL SHIELD AROUND  
PIPE AT HANGER WITH LOOSE FIT.  
COPPER TUBES TO HAVE 2" WIDE  
STRIP OF RUBBER FABRIC

TYPE A

FOR HANGER RODS 7/8" DIA  
AND LARGER, AND MIN 8"  
THICK CONCRETE

4" SQ  
1/2" PL  
TACK  
WELD  
8" MIN  
4" MIN

TYPE B

PIPE HANGER RODS AND SUPPORT SPACING

PIPE DIA (INCHES)	ROD DIA (INCHES)	MAX SUPPORT SPACING (FEET)		WEIGHT LIMIT (LBS)	
		STL PIPE	CI PIPE	TYPE A	TYPE B
1 & SMALLER	3/8	6	5	610	1700
1 1/4 TO 2	3/8	9	5	610	1700
2 1/2 TO 3 1/2	1/2	12	5	1130	3200
4 TO 5	5/8	14	5	1430	3800
6, 8	3/4	16	5	1430	3800
10, 12	7/8	18	—	1430	3800
14, 16	1	20	—	1430	3800

NOTE: GALVANIZE ALL PARTS AFTER FABRICATION

PIPE HANGER

M-401  
CIP

NOTES:

1. TYPE A - FOR CONCRETE INSERT, ALLOW 1430 LB LOAD MAX  
TYPE B - FOR 4" SQ BEARING PLATE, ALLOW 3800 LB LOAD MAX
2. CONCRETE STRENGTH TO BE 3000 PSI OR MORE
3. DESIGN IS FOR STATIC LOAD ONLY
4. ANCHORS SHALL BE 316 SS IF HANGER WILL BE SUBMERGED

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City of San Diego



STANDARD  
DETAIL

CIP

PIPE HANGER

M-401

'U'BOLT PIPE SUPPORT  
GRINNELL FIG 259  
OR EQUAL

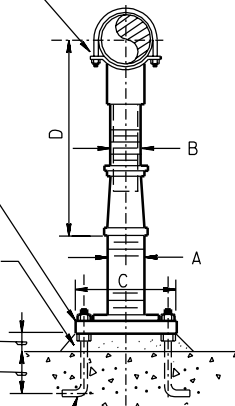
150 LB THREADED  
REDUCING FLANGE,  
GALVANIZED

NON-SHRINK GROUT

1" MINIMUM

3" MINIMUM

GALVANIZED STEEL  
ANCHOR BOLT  
WITH TWO NUTS AND  
ONE LOCKWASHER.  
(TYP OF 4 AT 90 °  
316 SS IF BURIED  
OR SUBMERGED



ADJUSTABLE PIPE SUPPORT  
DIMENSIONS IN INCHES

PIPE SIZE	A	B	C	D MINIMUM	D MAXIMUM
2-1/2	2-1/2	1-1/2	9	8	11-1/2
3	2-1/2	1-1/2	9	8-1/4	11-3/4
3-1/2	2-1/2	1-1/2	9	8-1/2	12
4	3	2-1/2	9	10-1/4	14
6	3	2-1/2	9	11-5/8	15-1/4
8	3	2-1/2	9	13-5/8	16-1/2
10	3	2-1/2	9	14-5/8	18-1/4
12	3	2-1/2	9	15-5/8	19-3/4
14	4	3	11	18-7/8	20-3/4
16	4	3	11	19-7/8	22-1/4
18	6	3-1/2	13-1/2	21-1/4	24
20	6	3-1/2	13-1/2	23-1/4	25-1/2
24	6	4	13-1/2	26-1/2	28-1/4
30	6	4	13-1/2	29-5/8	31-1/2
32	6	4	13-1/2	30-5/8	32-3/4
36	6	4	13-1/2	32-5/8	34-3/4

ADJUSTABLE PIPE SUPPORT  
WITH 'U' BOLT

M-402  
CIP

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WATER DEPARTMENT  
City of San Diego

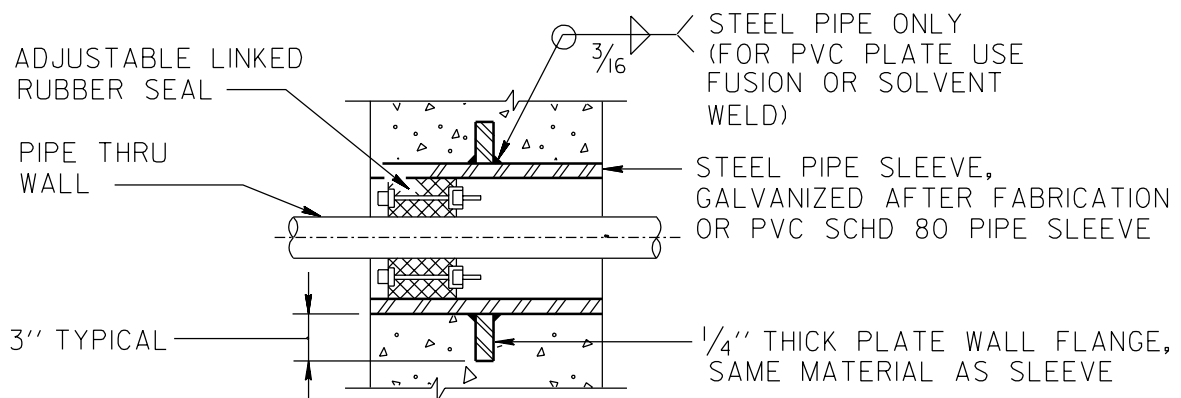


STANDARD  
DETAIL

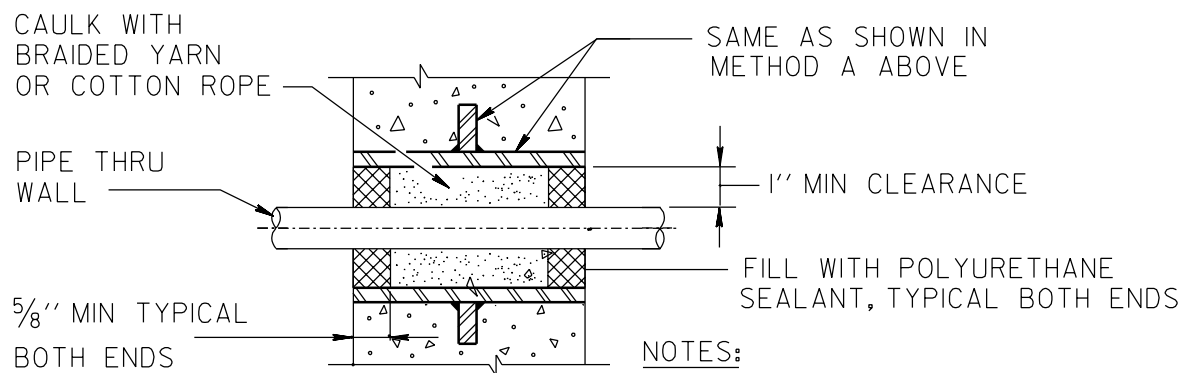
ADJUSTABLE PIPE SUPPORT  
WITH 'U' BOLT

CIP

M-402



METHOD A

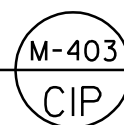


NOTES:

1. NOT FOR USE IN RETAINING WALLS AND HYDRAULIC STRUCTURES.
2. SEALANT TO COMPLY WITH FIRE RATING OF WALL

METHOD B

SLEEVED WALL PIPE OPENING



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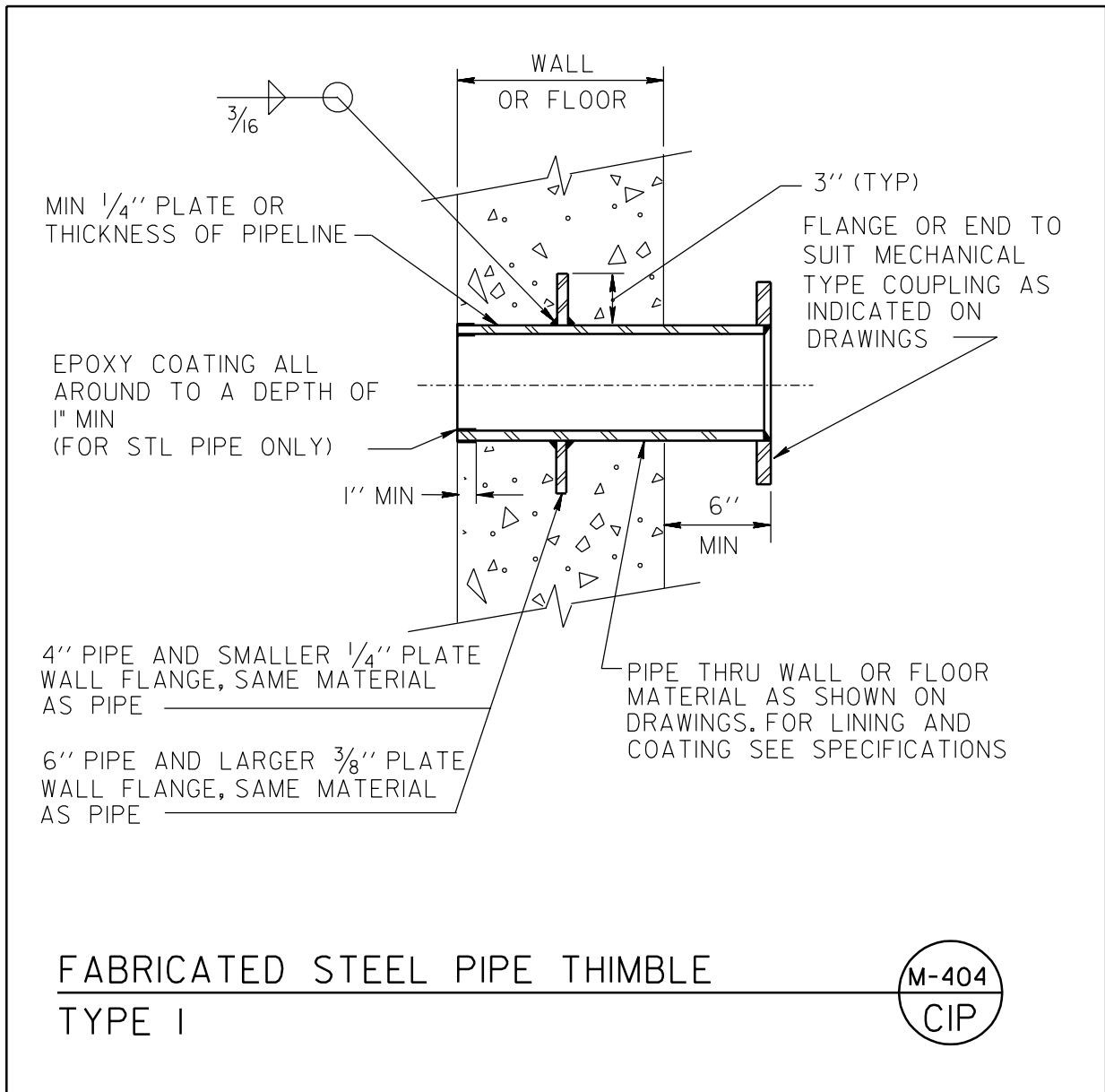


STANDARD  
DETAIL

CIP

SLEEVED WALL PIPE OPENING

M-403



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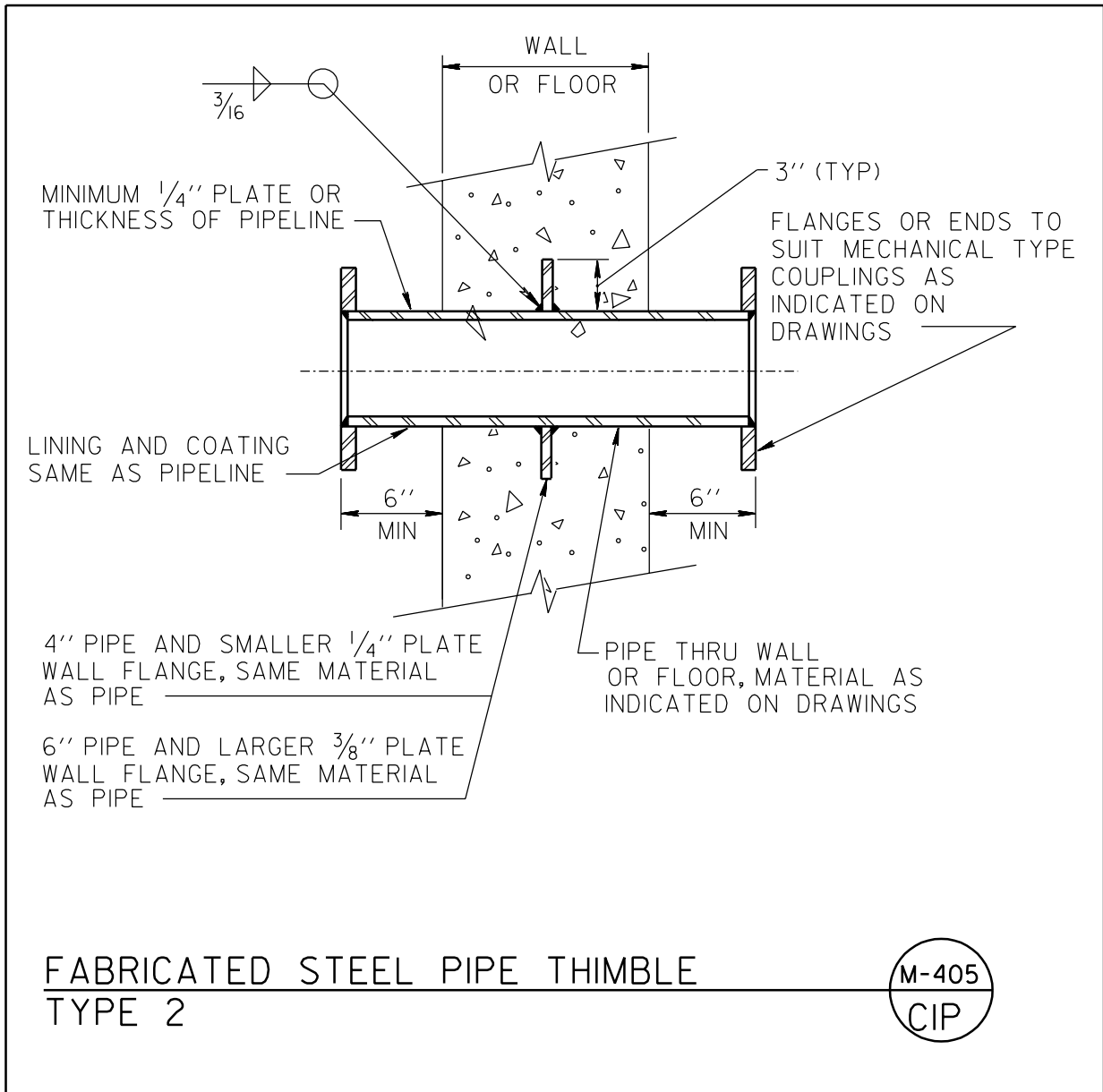


STANDARD  
DETAIL

CIP

**FABRICATED STEEL PIPE THIMBLE  
TYPE I**

M-404



REVISION	BY	APPROVED	DATE
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City of San Diego

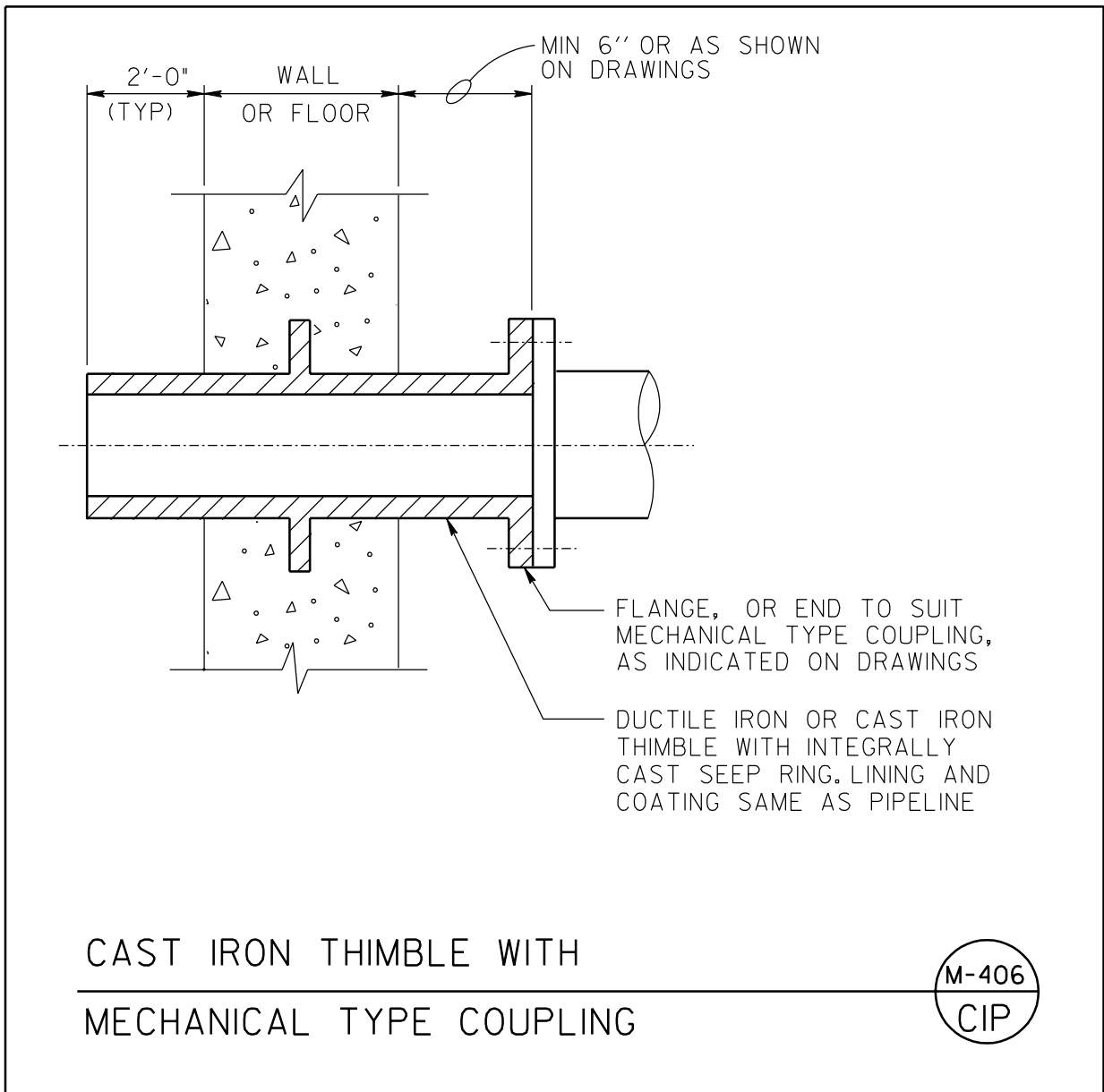


STANDARD  
DETAIL

CIP

**FABRICATED STEEL PIPE THIMBLE  
TYPE 2**

**M-405**




REVISION	BY	APPROVED	DATE

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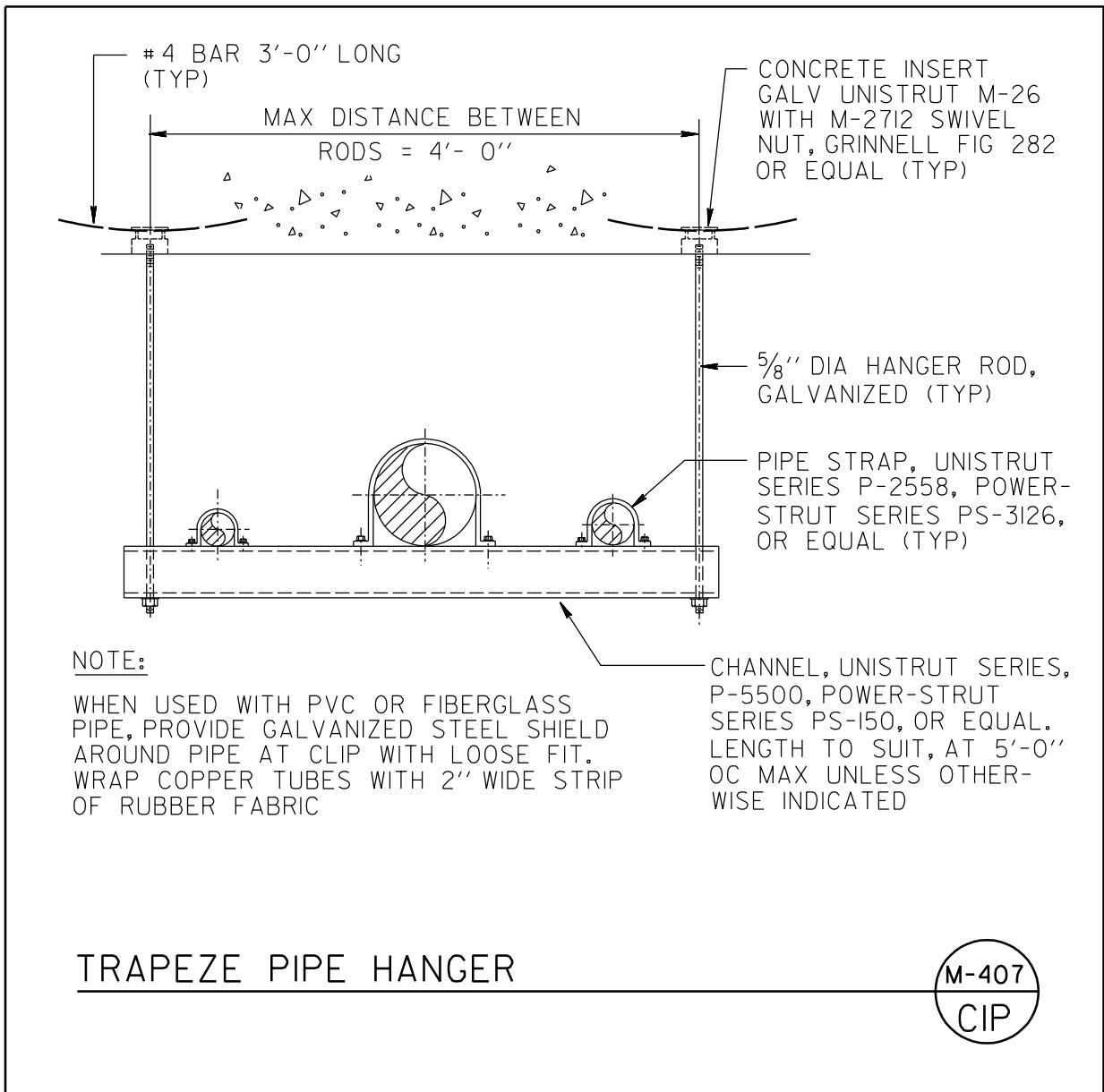
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**CAST IRON THIMBLE WITH  
MECHANICAL TYPE COUPLING**

STANDARD DETAIL
CIP
M-406



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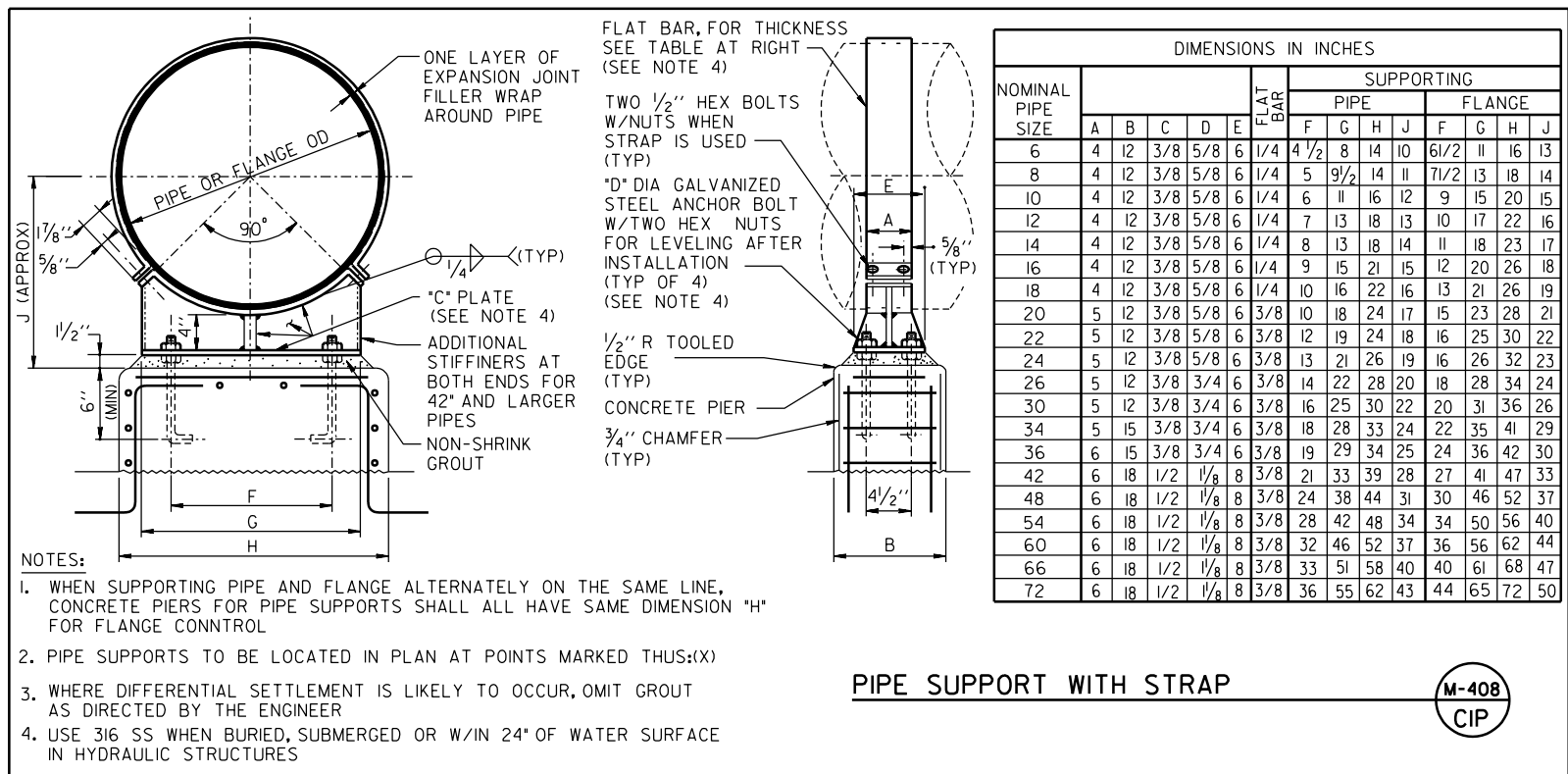
STANDARD  
DETAIL

CIP

**TRAPEZE PIPE HANGER**

M-407





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STANDARD  
DETAIL

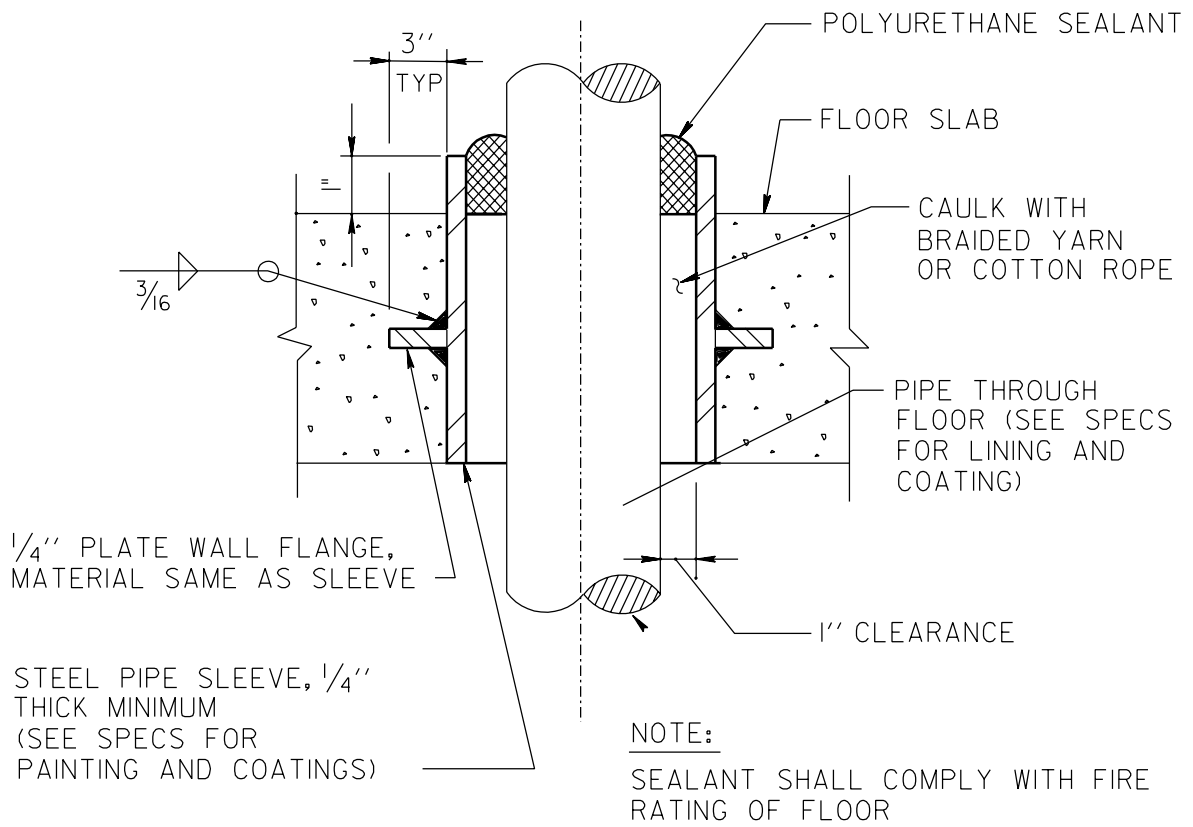
CIP

PIPE SUPPORT WITH STRAP

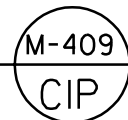
M-408

NOTE:

1. THIS SLEEVE IS TO BE USED BETWEEN DRY AREAS ONLY
2. NOT FOR SLABS ON GRADE



FLOOR PIPE SLEEVE



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STANDARD  
DETAIL

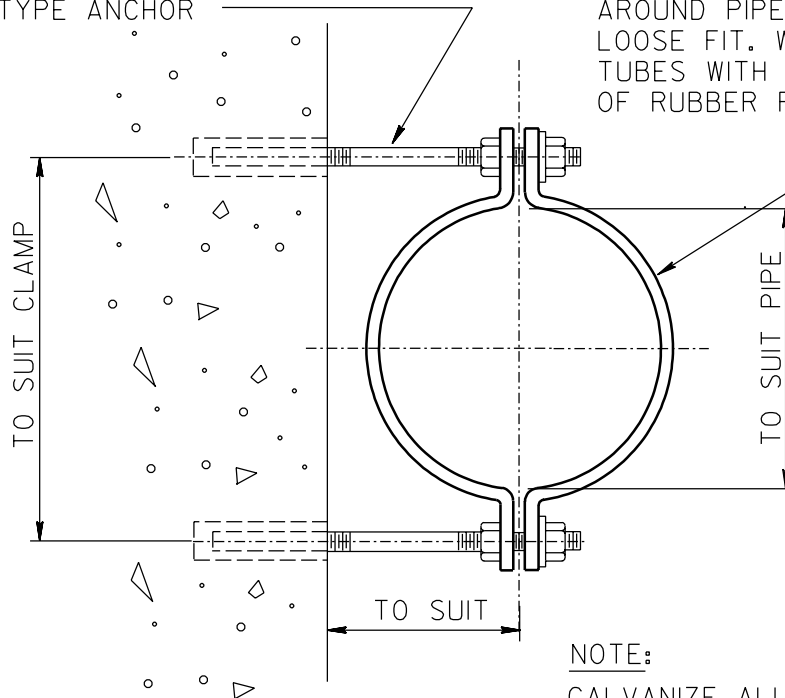
CIP

FLOOR PIPE SLEEVE

M-409

STUD BOLT, MIN  $\frac{1}{2}$ " DIA  
WITH TWO HEX NUTS  
& LOCKWASHERS, SET  
IN ADHESIVE EPOXY  
TYPE ANCHOR

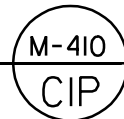
FLAT BAR  $1\frac{1}{2}$ " X  $\frac{1}{4}$ " PIPE  
CLAMP. WHEN USED WITH  
PVC OR FIBERGLASS PIPE  
PROVIDE STEEL SHEILD  
AROUND PIPE AT CLAMP WITH  
LOOSE FIT. WRAP COPPER  
TUBES WITH 2" WIDE STRIP  
OF RUBBER FABRIC



NOTE:

GALVANIZE ALL PARTS AFTER  
FABRICATION. WHERE SUBMERGED,  
PIPE CLAMP, ANCHORS, NUTS,  
LOCKWASHERS AND SHIELDS TO BE  
TYPE 316 SS

PIPE CLAMP



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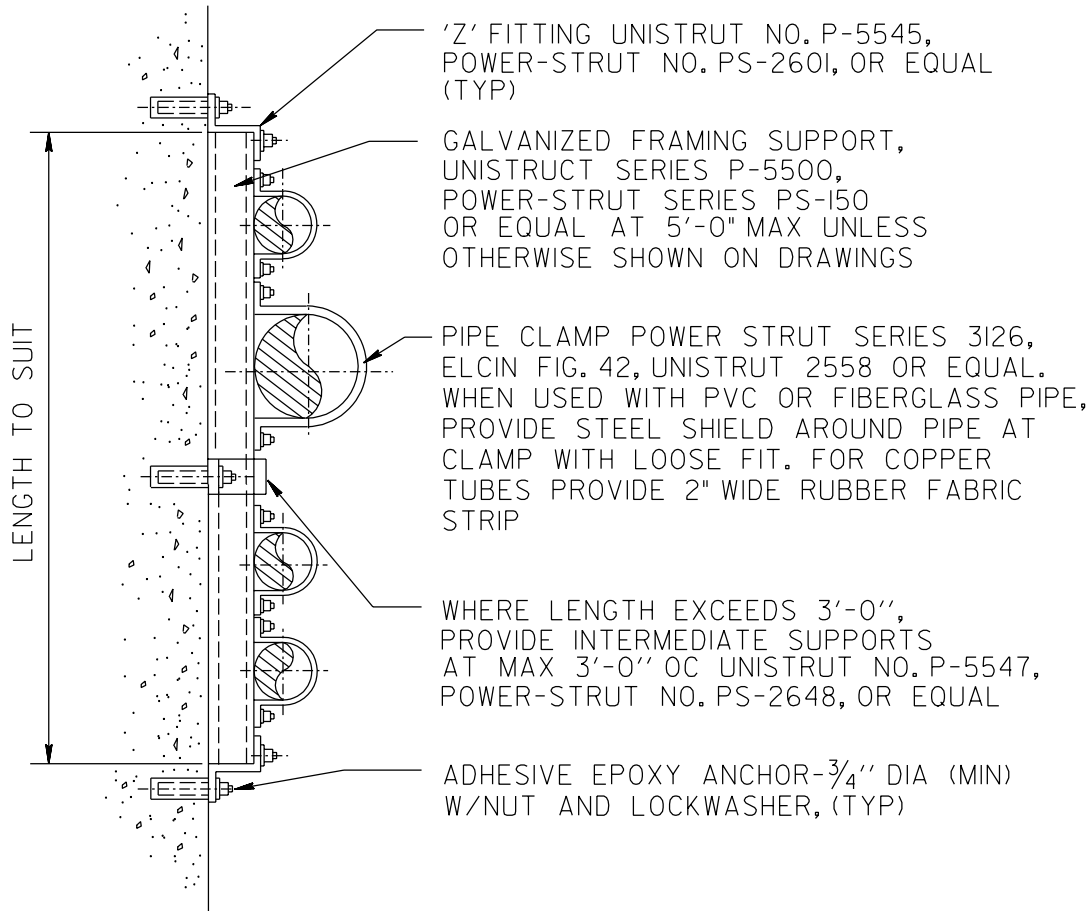


STANDARD  
DETAIL

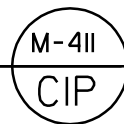
CIP

M-410

PIPE CLAMP



FLUSH MOUNTED PIPE SUPPORT



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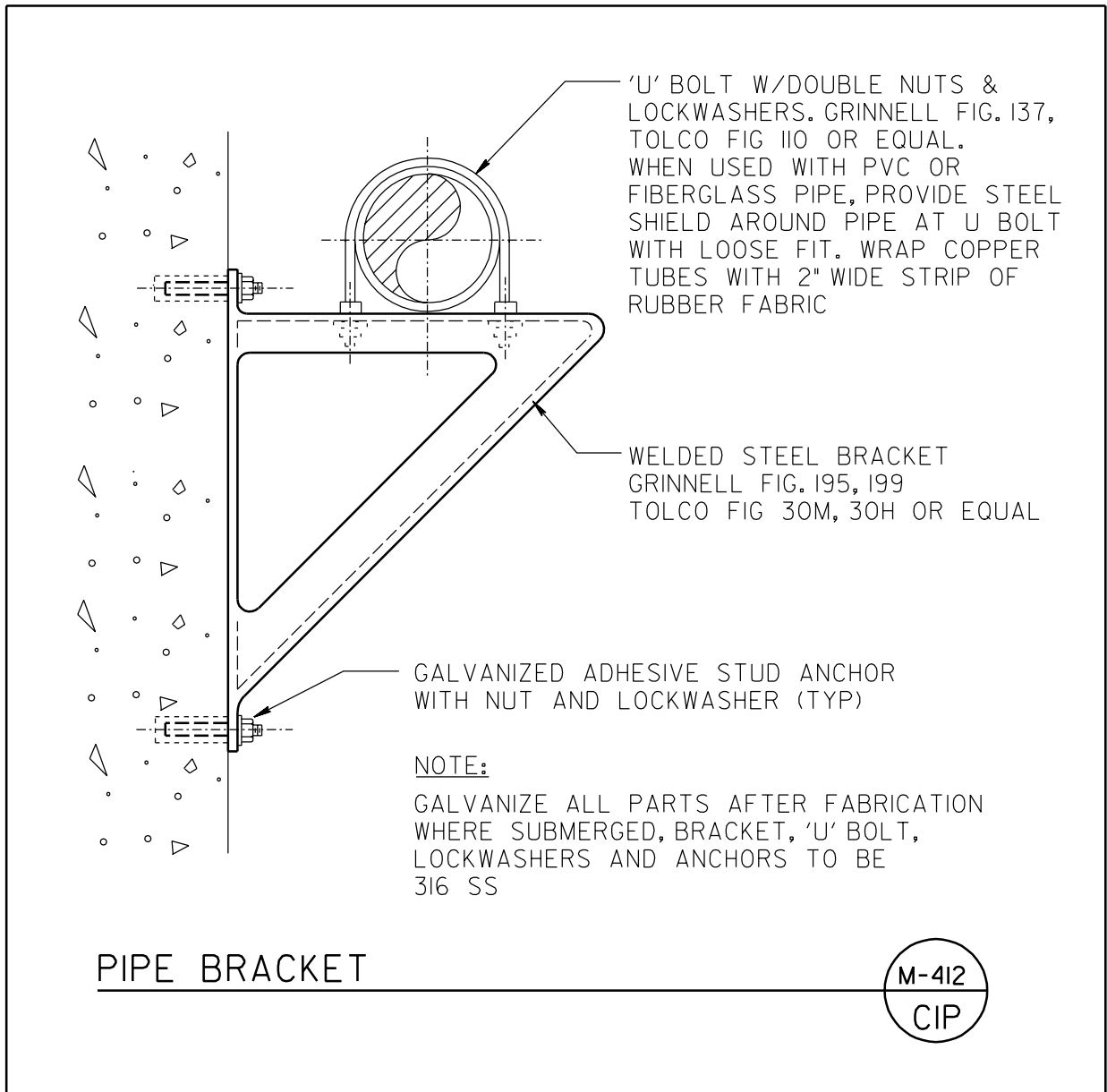


STANDARD  
DETAIL

CIP

M-4II

FLUSH MOUNTED PIPE SUPPORT



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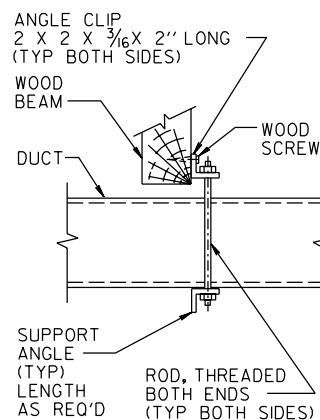


STANDARD  
DETAIL

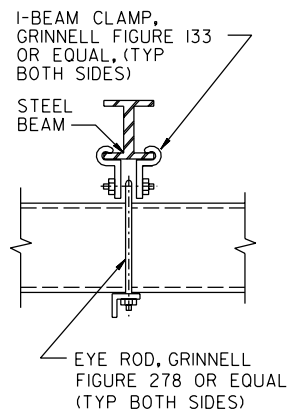
CIP

PIPE BRACKET

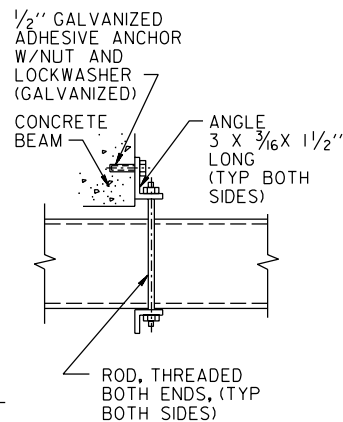
M-412



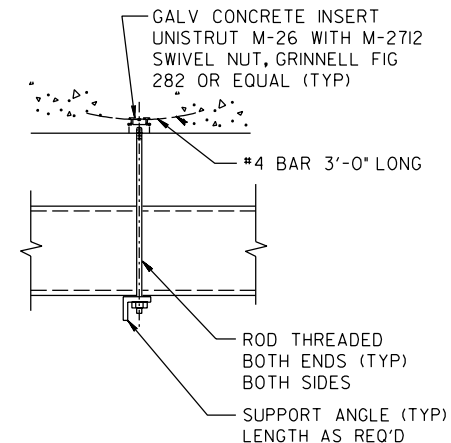
ON WOOD BEAM



ON STEEL BEAM



ON CONCRETE BEAM



CONCRETE BEAM OR SLAB HANGER

SIZING AND SPACING (INCHES)			
MAX DUCT SIZE	ROD DIA	SUPPORT ANGLE	MAXIMUM SPACING
36 X 12	3/8	1-1/2 X 1 1/2 X 1/8	8'-0" ON CENTER
48 X 18	1/2	2 X 2 X 1/8	8'-0" ON CENTER
60 X 24	1/2	2 X 2 X 3/16	6'-0" ON CENTER
80 X 24	1/2	2 X 2 X 1/4	6'-0" ON CENTER

## HANGERS FOR DUCTS

M-413  
CIP

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City of San Diego

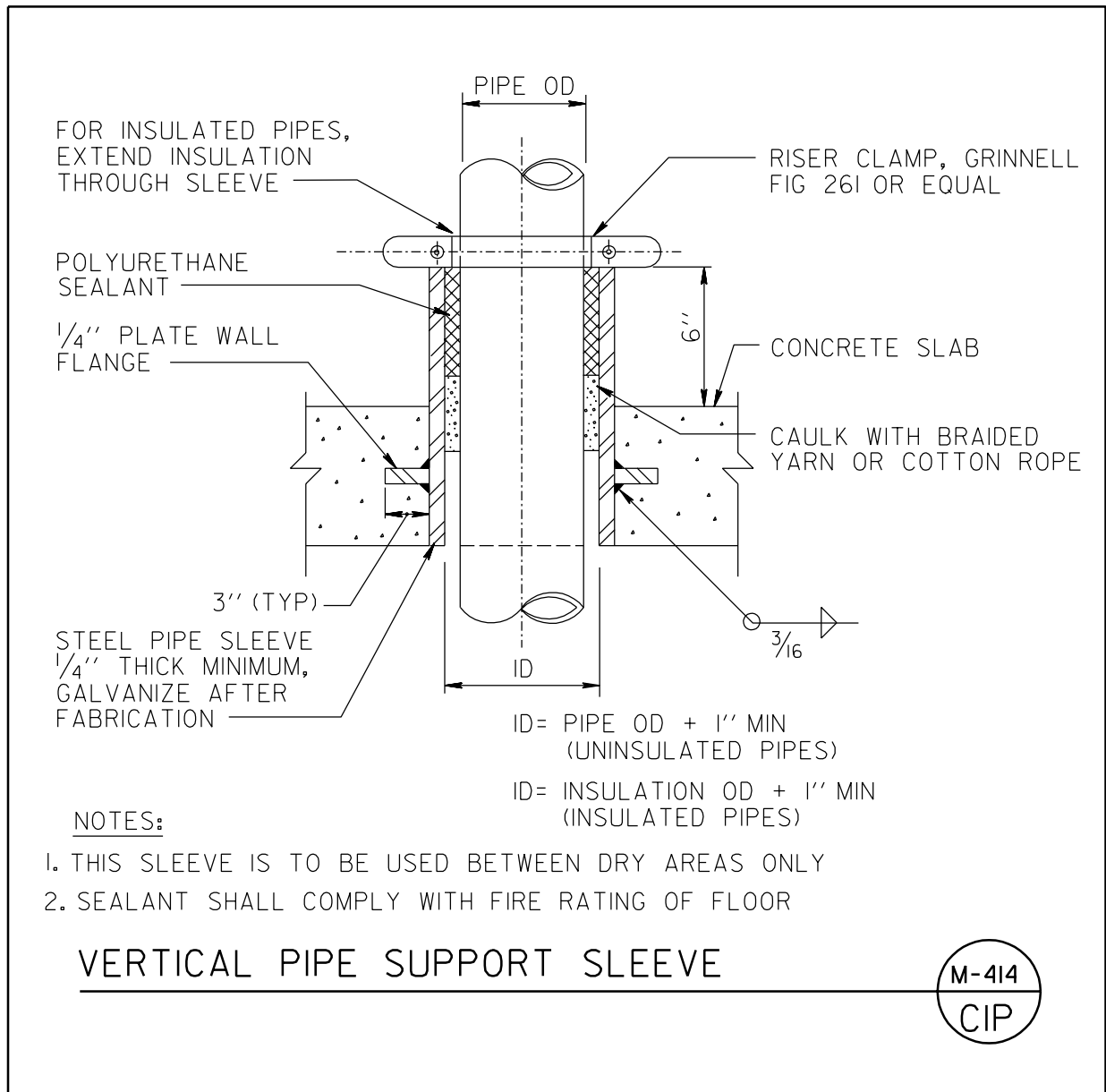


STANDARD  
DETAIL

CIP

**HANGERS FOR DUCTS**

M-413



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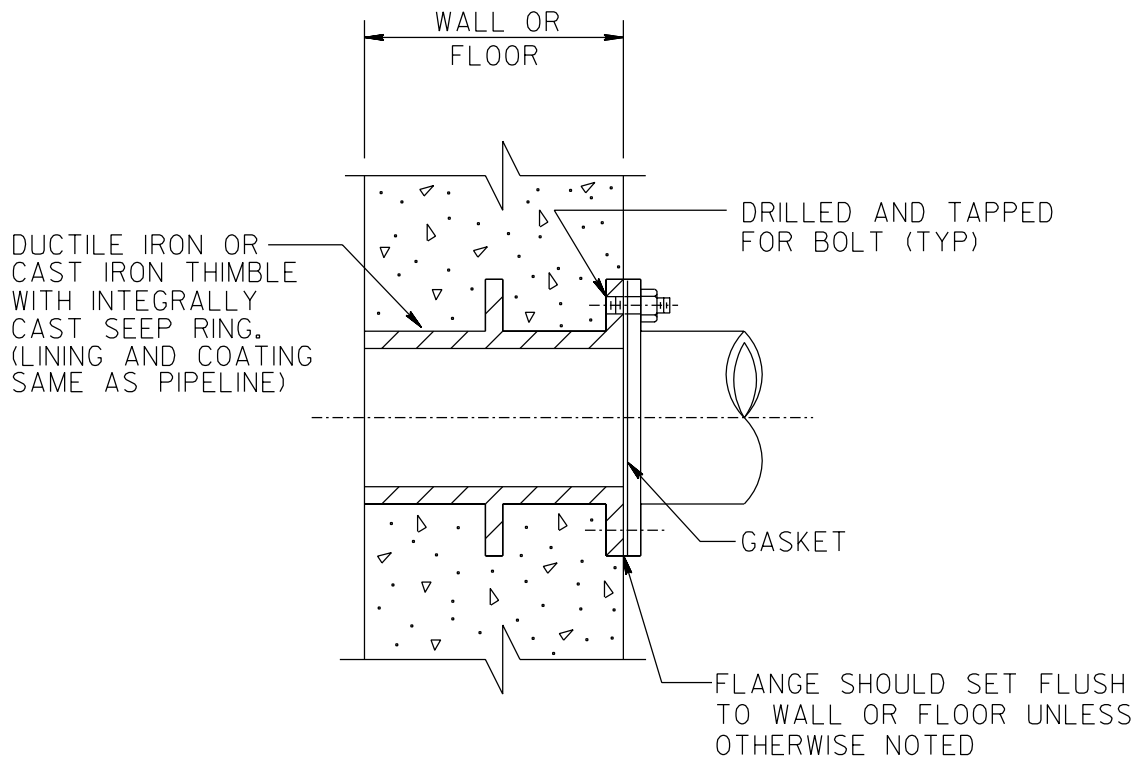


STANDARD  
DETAIL

CIP

**VERTICAL PIPE SUPPORT SLEEVE**

M-414



FLANGE AND SPIGOT DUCTILE  
IRON OR CAST IRON THIMBLE

M-415

CIP

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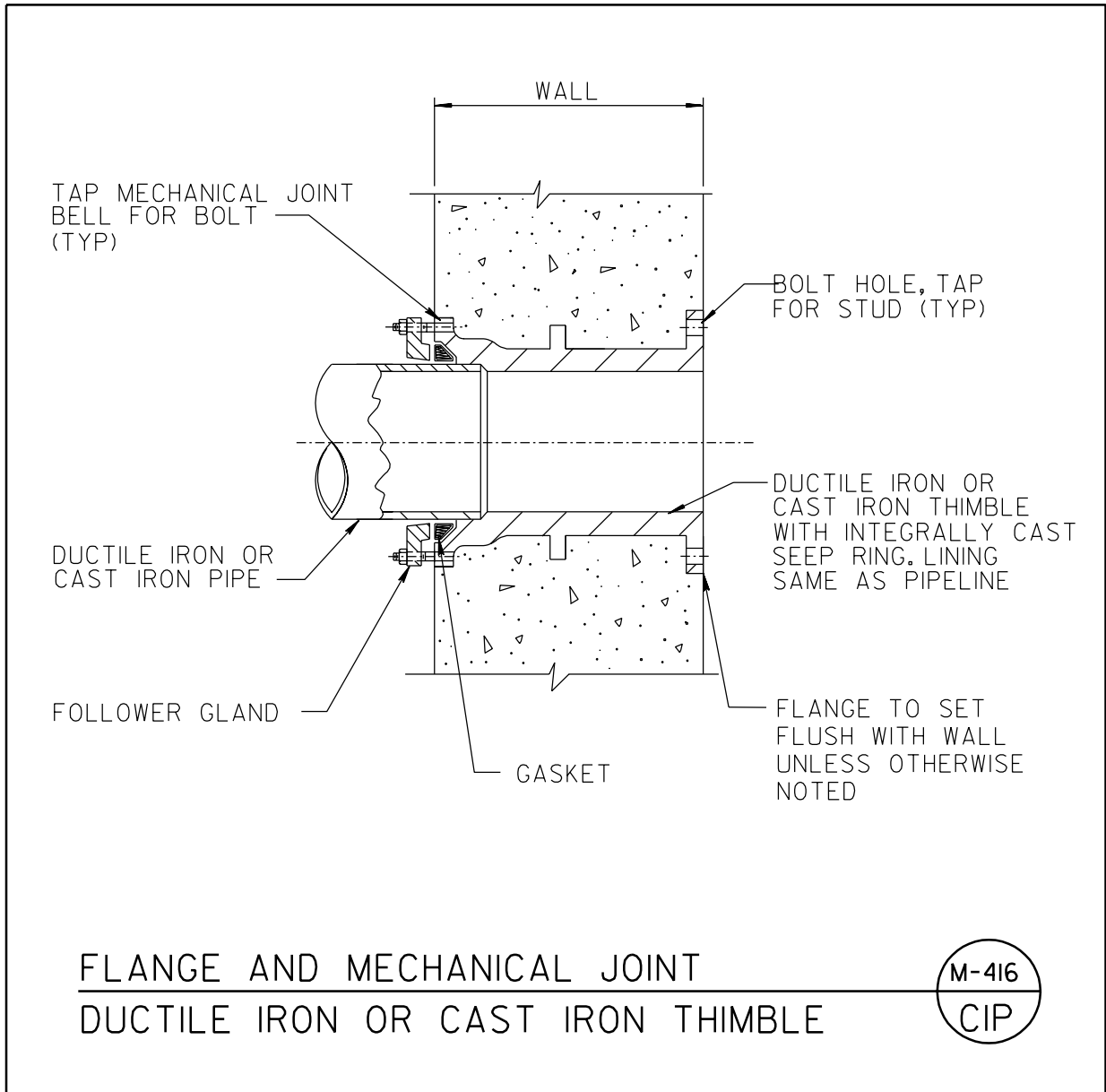
STANDARD  
DETAIL

CIP

FLANGE AND SPIGOT DUCTILE  
IRON OR CAST IRON THIMBLE

M-415





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**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

FLANGE AND MECHANICAL JOINT  
DUCTILE IRON OR CAST IRON THIMBLE

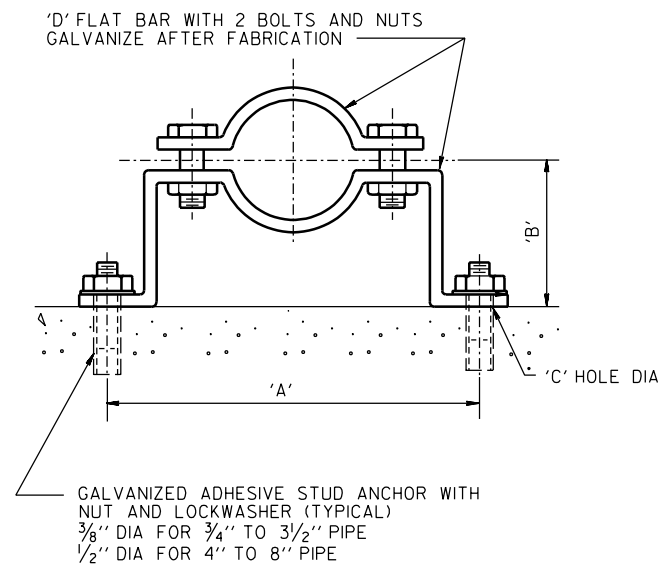
M-416

DIMENSIONS IN INCHES					
PIPE DIA	A	B SEE NOTE 3 BELOW	C HOLE DIA	D FLAT BAR SIZE	LOAD RATING LBS *
3/4	5-15/16	2-1/2	7/16	3/16 x 1-1/4	300
1	6-1/4	2-5/8	7/16	3/16 x 1-1/4	300
1-1/4	6-11/16	2-3/4	7/16	3/16 x 1-1/4	300
1-1/2	6-15/16	3	7/16	3/16 x 1-1/4	300
2	8-5/16	3-3/16	7/16	1/4 x 1-1/4	500
2-1/2	8-7/8	3-7/16	7/16	1/4 x 1-1/4	500
3	9-1/8	3-3/4	7/16	1/4 x 1-1/4	500
3-1/2	10-1/16	4	7/16	1/4 x 1-1/4	500
4	10-9/16	4-1/4	9/16	1/4 x 1-1/2	600
5	11-3/4	4-3/4	9/16	1/4 x 1-1/2	600
6	14-3/8	5-5/16	9/16	3/8 x 1-1/2	850
8	16-5/8	6-5/16	9/16	3/8 x 1-1/2	850

\*SAFETY FACTOR OF 5

**NOTES:**

1. WHERE SUBMERGED, BURIED, OR IN HYDRAULIC STRUCTURES PIPE CLAMP, ANCHOR, SHIELD, NUTS AND LOCKWASHER TO BE TYPE 316 STAINLESS STEEL
2. WHEN USED WITH PVC OR FIBERGLASS PIPE, PROVIDE STEEL SHIELD AROUND PIPE AT CLAMP, WITH LOOSE FIT. WRAP COPPER TUBES WITH 2" STRIP OF RUBBER FABRIC
3. FOR FLANGED PIPING, INCREASE 'B' DIMENSION AS REQUIRED



**PIPE CLAMP FOR INDIVIDUAL PIPES**



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**WATER DEPARTMENT**  
City of San Diego

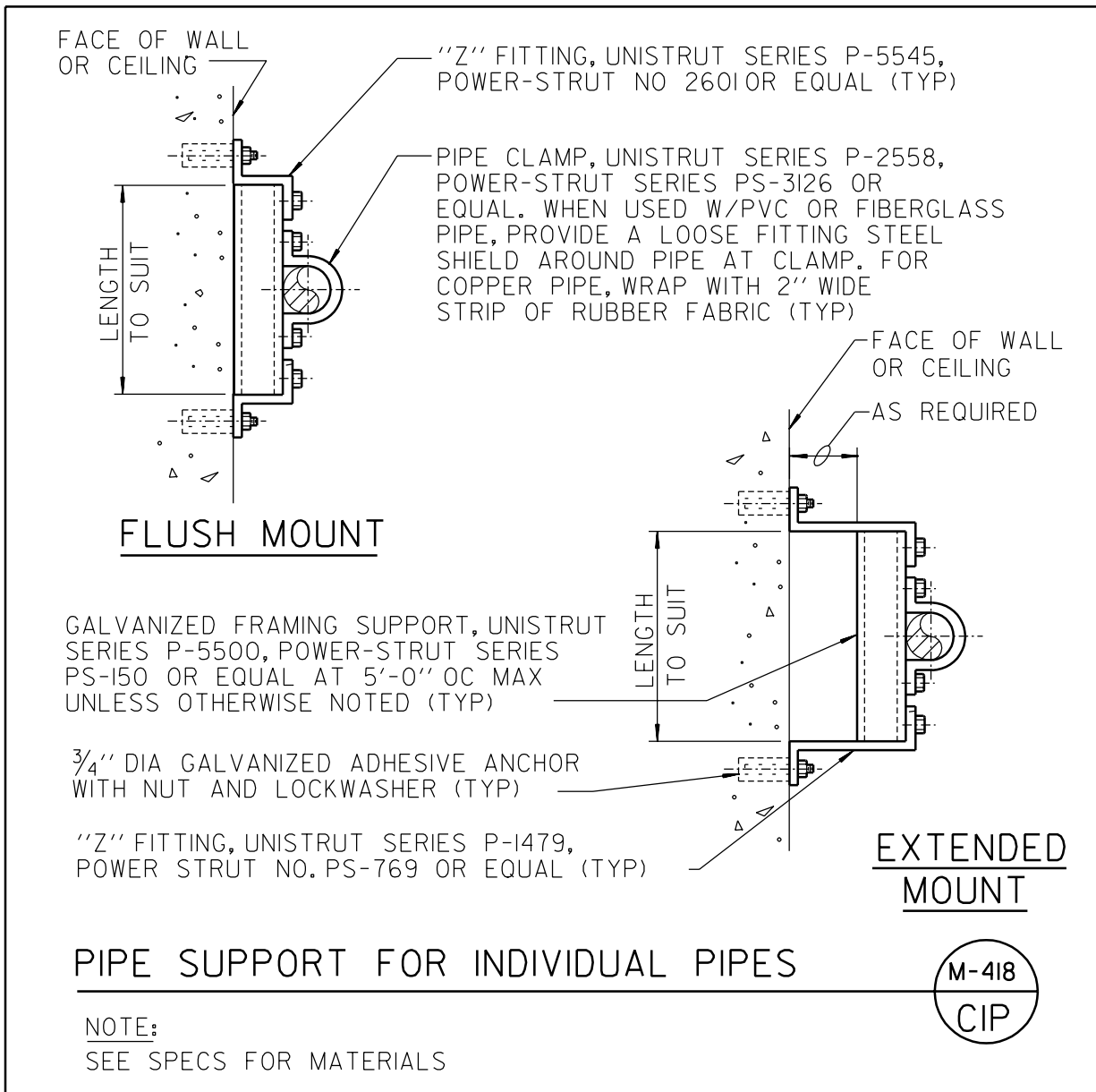


STANDARD  
DETAIL

CIP

**PIPE CLAMP FOR INDIVIDUAL PIPES**

**M-417**



NOTE: USE THIS DETAIL FOR PIPES 6 INCHES AND SMALLER IN DIAMETER

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City of San Diego



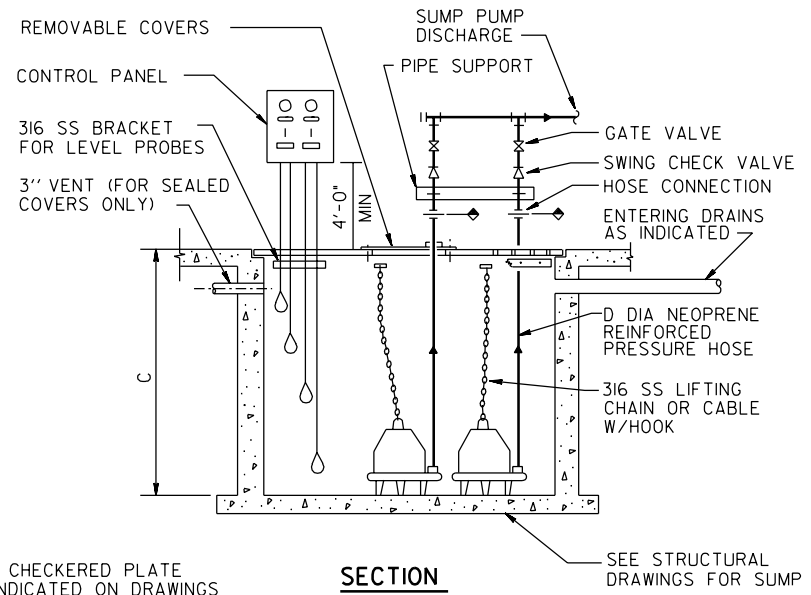
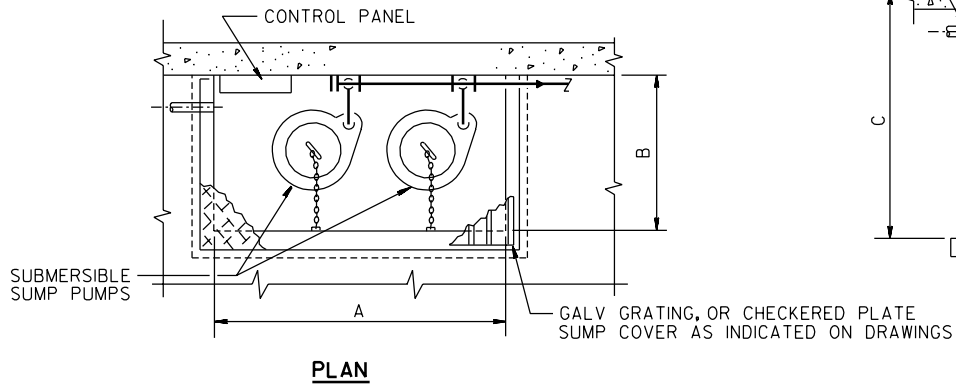
**PIPE SUPPORT  
FOR INDIVIDUAL PIPES**

STANDARD  
DETAIL

CIP

M-418

PUMP NO	LOCATION	DIMENSIONS IN INCHES				
		A	B	C	D	E



**DRAINAGE SUMP WITH DUPLEX PUMPS**

M-419  
CIP

**NOTE:**  
COMPLETE TABLE FOR ALL DUPLEX  
SUMPS ON THE PROJECT

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**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

**DRAINAGE SUMP WITH DUPLEX PUMPS**

M-419

MOLDED FIBERGLASS  
HOOD SEE SPECS

PLASTIC COATED  
GALVANIZED STEEL  
BIRD SCREEN

LOW SILHOUETTE

ONE PIECE, MOLDED  
CURB AND FLASHING  
TO MATCH VENTILATOR  
BASE

SEE NOTE 1

ROOF

ALUMINUM GRILLE  
OR DUCT SEE NOTE 2

SQUARE ROOF OPENING

NOTES:

1. MINIMUM 12" IF USED AS AIR INTAKE.  
MINIMUM 6" IF USED AS RELIEF VENT
2. WITH SUSPENDED CEILING INSTALL FULL-SIZE  
DUCT FROM ROOF OPENING TO CEILING GRILLE

AIR INTAKE OR RELIEF VENT

M-420  
CIP

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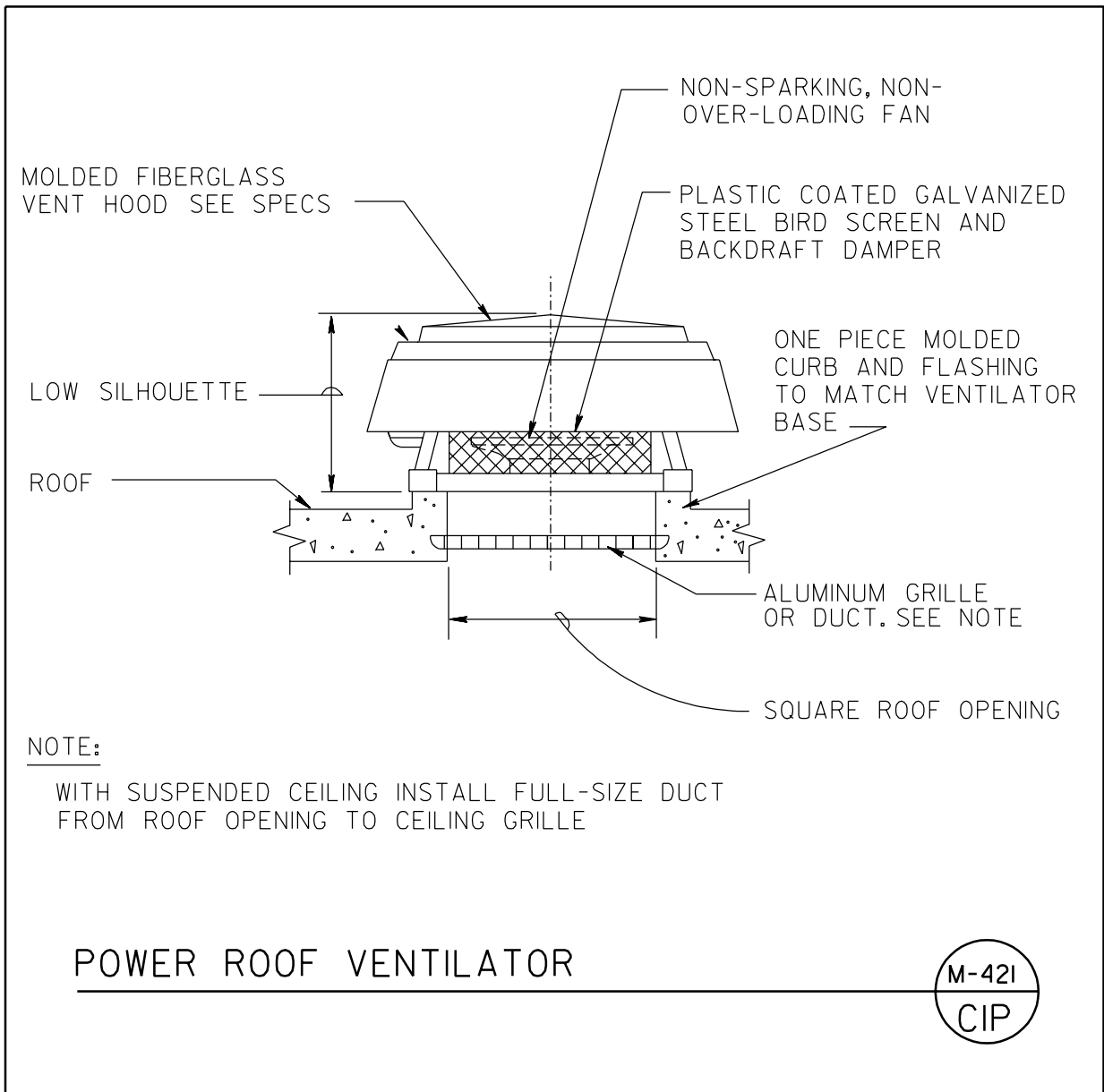


STANDARD  
DETAIL

CIP

AIR INTAKE OR RELIEF VENT

M-420



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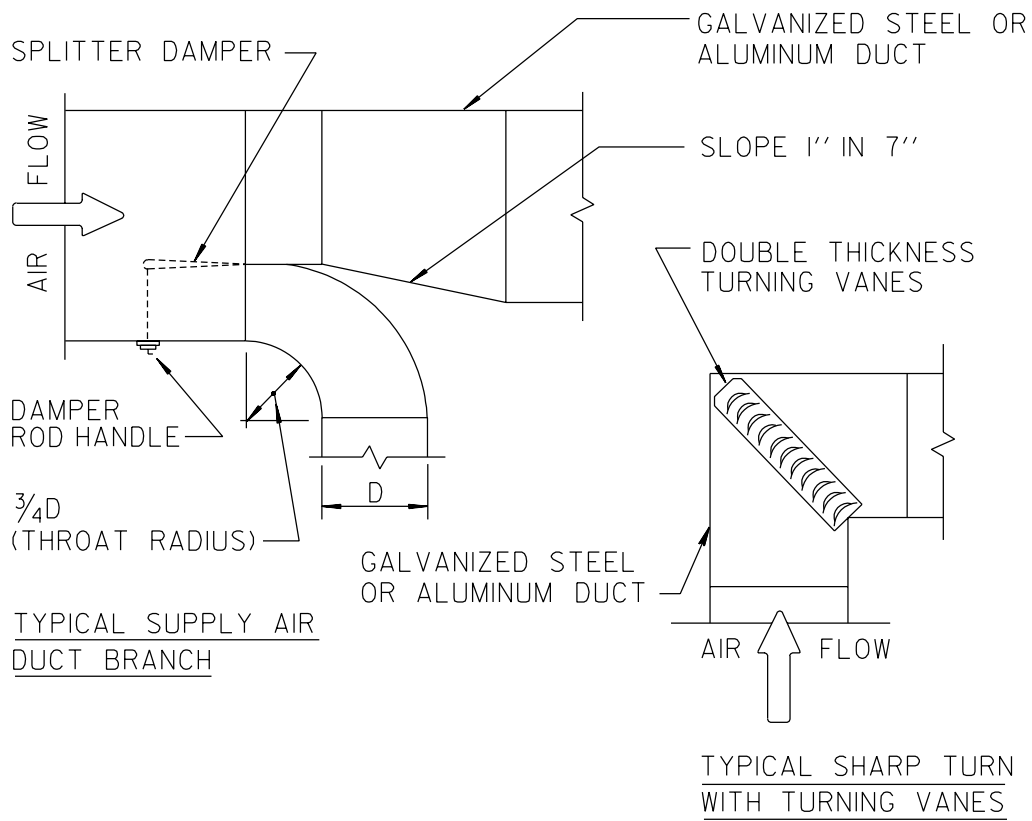
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WATER DEPARTMENT

City of San Diego

POWER ROOF VENTILATOR

STANDARD DETAIL
CIP
M-421



## AIR DUCT DETAILS

M-422  
CIP

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**WATER DEPARTMENT**  
City of San Diego

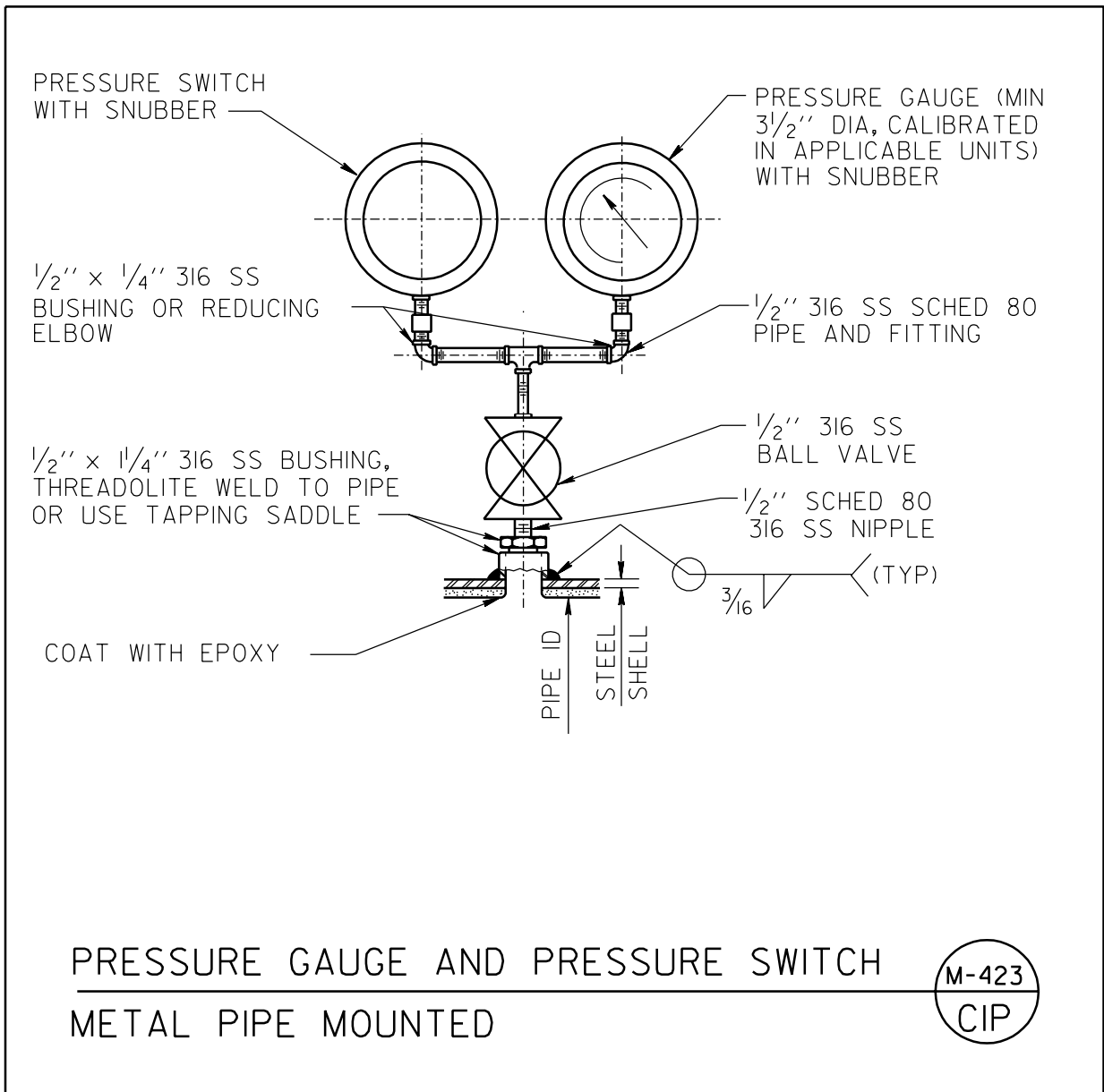


STANDARD  
DETAIL

CIP

AIR DUCT DETAILS

M-422



**NOTES:**

FOR STANDARD APPLICATIONS ON WATER, AIR AND GAS LINES.  
WHERE PIPE VIBRATION OR PULSATION IS EXPECTED,  
MAKE SUITABLE PROVISION WITH FLEXIBLE  
CONNECTORS AND INDEPENDENT GAUGE SUPPORT

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City of San Diego



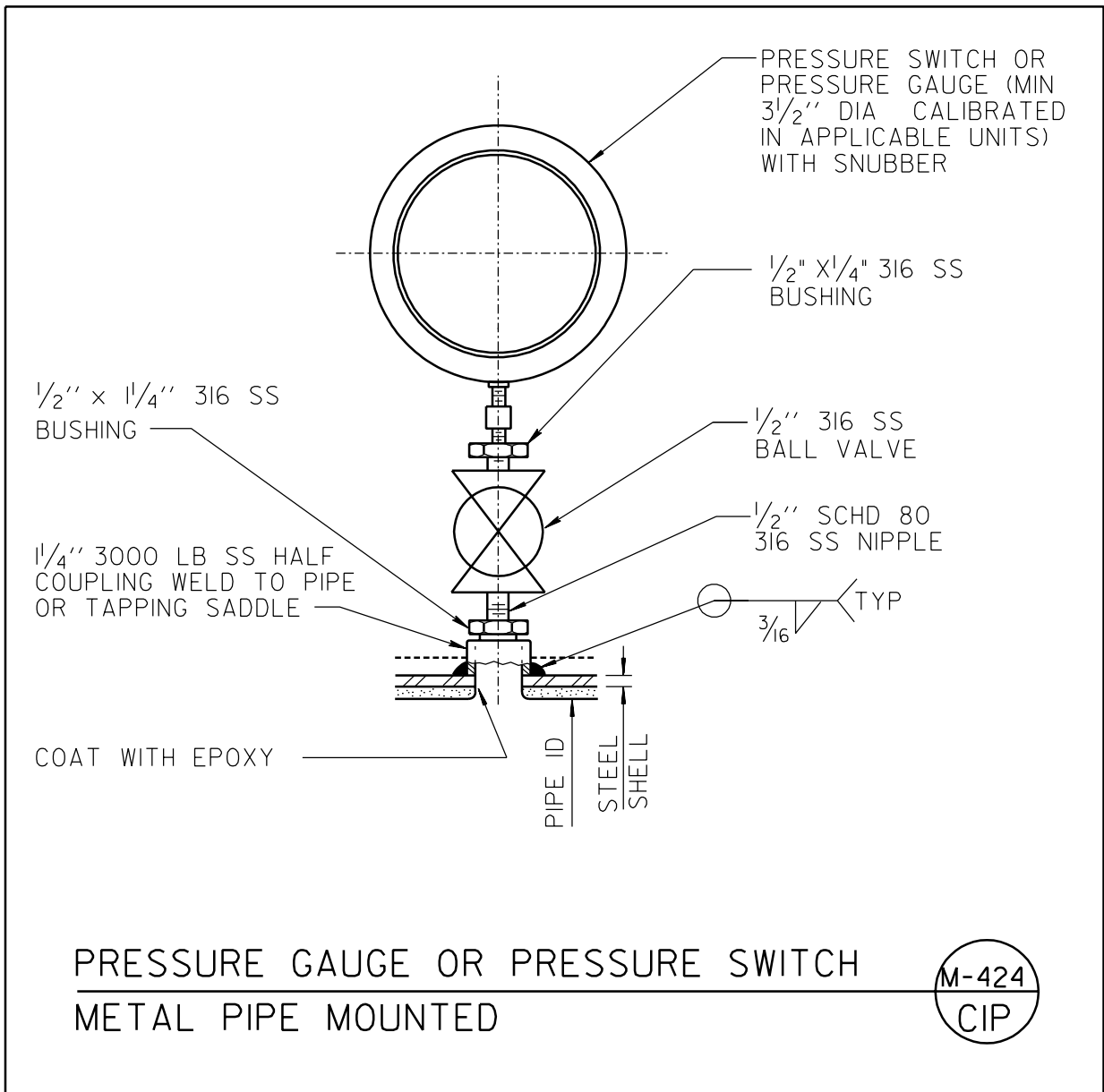
STANDARD  
DETAIL

CIP

**PRESSURE GAUGE AND PRESSURE  
SWITCH, METAL PIPE MOUNTED**

**M-423**





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**WATER DEPARTMENT**  
City of San Diego

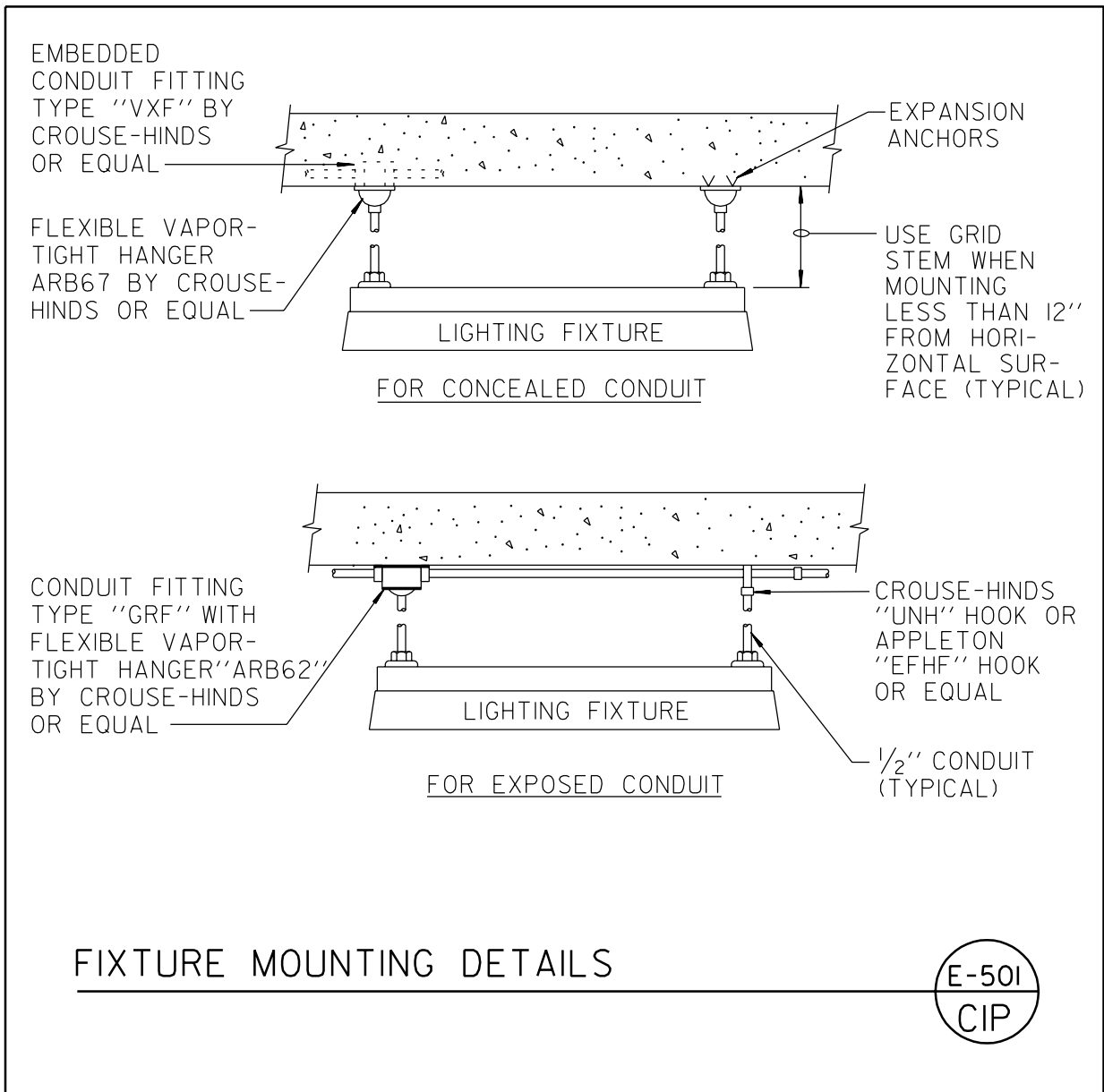


STANDARD  
DETAIL

CIP

**PRESSURE GAUGE OR PRESSURE  
SWITCH, METAL PIPE MOUNTED**

**M-424**



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City of San Diego

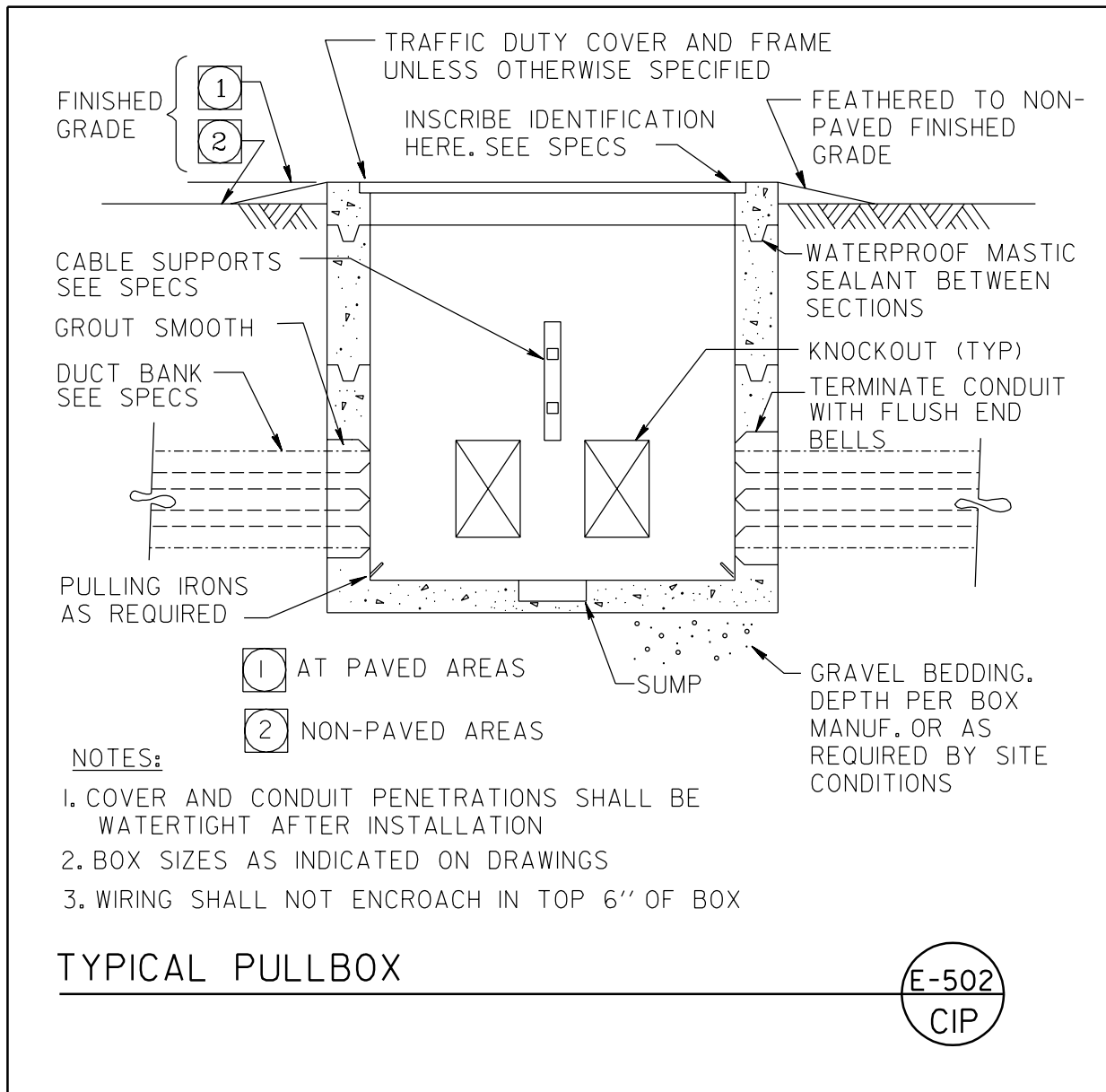


STANDARD  
DETAIL

CIP

E-501

**FIXTURE MOUNTING DETAILS**



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City of San Diego



STANDARD  
DETAIL

CIP

**TYPICAL PULLBOX**

**E-502**

CONTINUOUS  
DUCT BANK MARKER  
(SEE SPECS)

FINISH GRADE

#4 BAR AT  
12" EACH FACE

#4 HOOPS  
AT 24" OC

24" MINIMUM

4" (MIN)

8" MIN LAP

2" (TYP)

NOTES:

1. CONCRETE SHALL CONTAIN AN INTEGRAL RED OXIDE COLORING PIGMENT
2. ENCASE A NO. 4/0 BARE STRANDED COPPER GROUND WIRE  
THROUGHOUT THE ENTIRE LENGTH OF DUCT BANK

TYPICAL DUCT BANK

E-503  
CIP

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City of San Diego

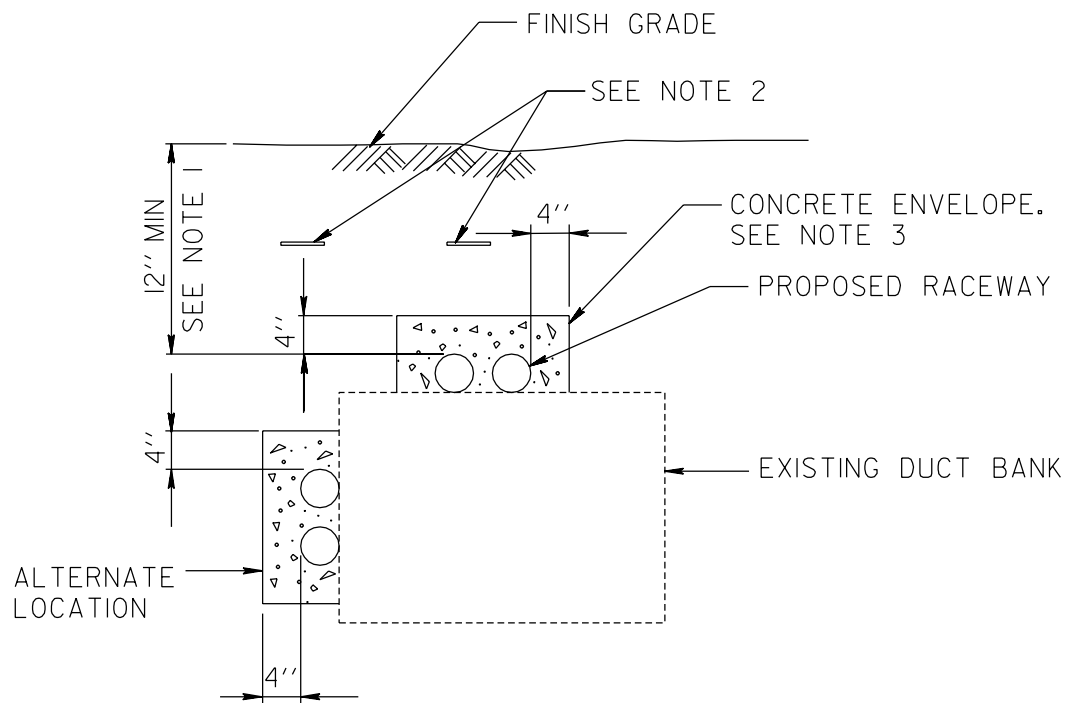


STANDARD  
DETAIL

CIP

TYPICAL DUCT BANK

E-503



**NOTES:**

1. LOCATE NEW DUCT AT SIDE OF EXISTING DUCT BANK  
IF 12" MIN DEPTH CANNOT BE ATTAINED AT TOP LOCATION
2. PROVIDE TRENCH MARKER TAPE  
6" TO 12" BELOW GRADE
3. COLOR CONCRETE WITH INTEGRAL RED OXIDE PIGMENT

**DUCT BANK EXPANSION**



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**WATER DEPARTMENT**  
City of San Diego

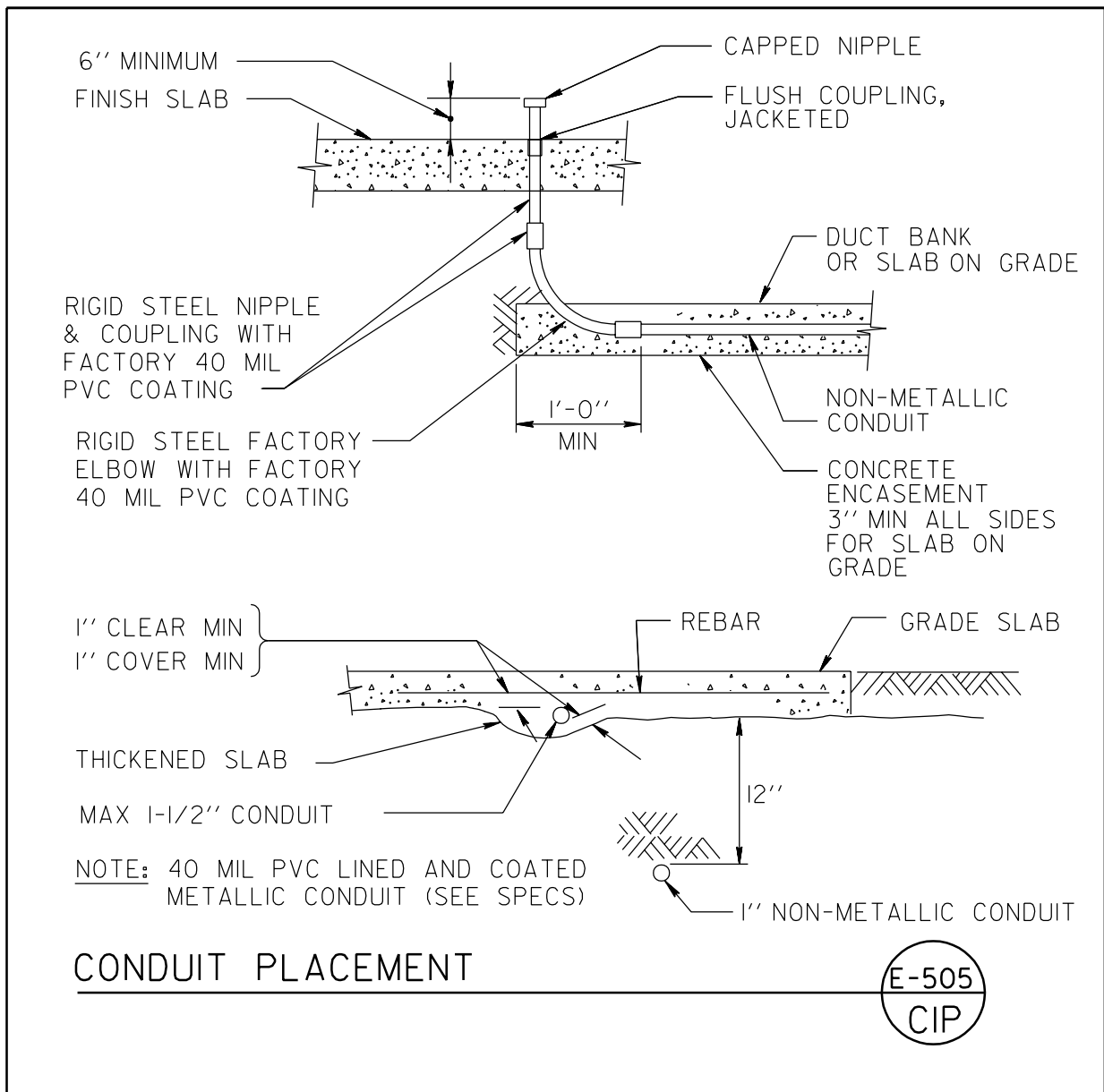


**DUCT BANK EXPANSION**

STANDARD  
DETAIL


CIP

E-504



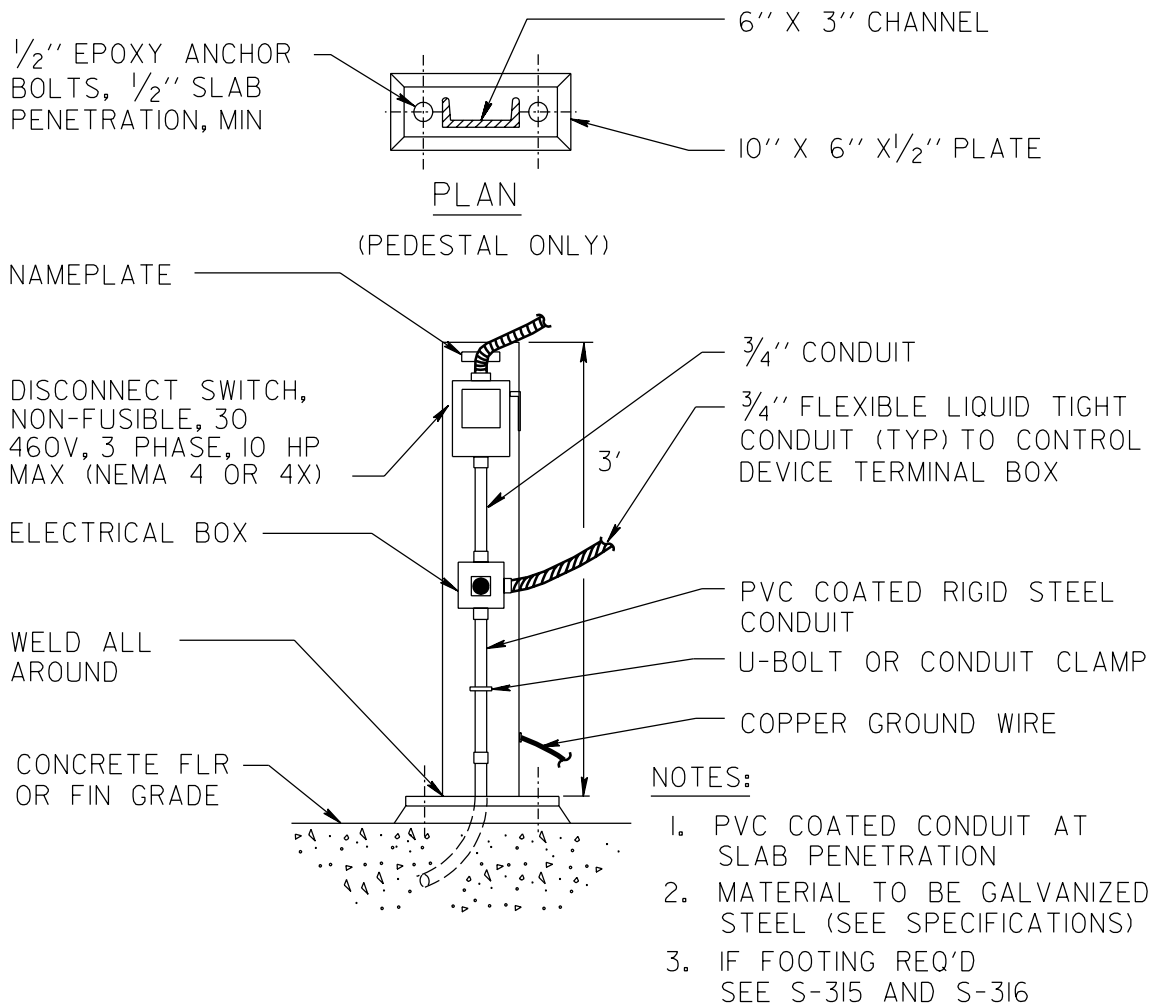
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City of San Diego



**CONDUIT PLACEMENT**

STANDARD DETAIL
CIP
E-505



PEDESTAL  
MOUNTED DISCONNECT



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City of San Diego

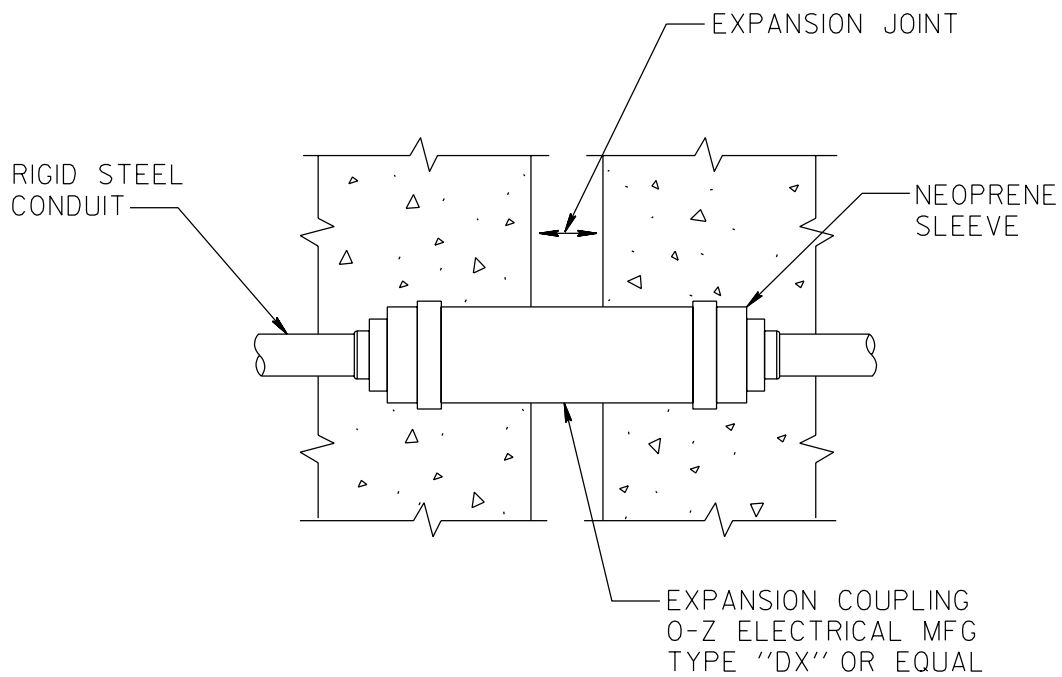


STANDARD  
DETAIL

CIP

PEDESTAL MOUNTED DISCONNECT

E-506



NOTE:

PROVIDE EXTERNAL BONDING JUMPER WHEN COUPLING HAS NO  
INTERIOR JUMPER

EXPANSION COUPLING



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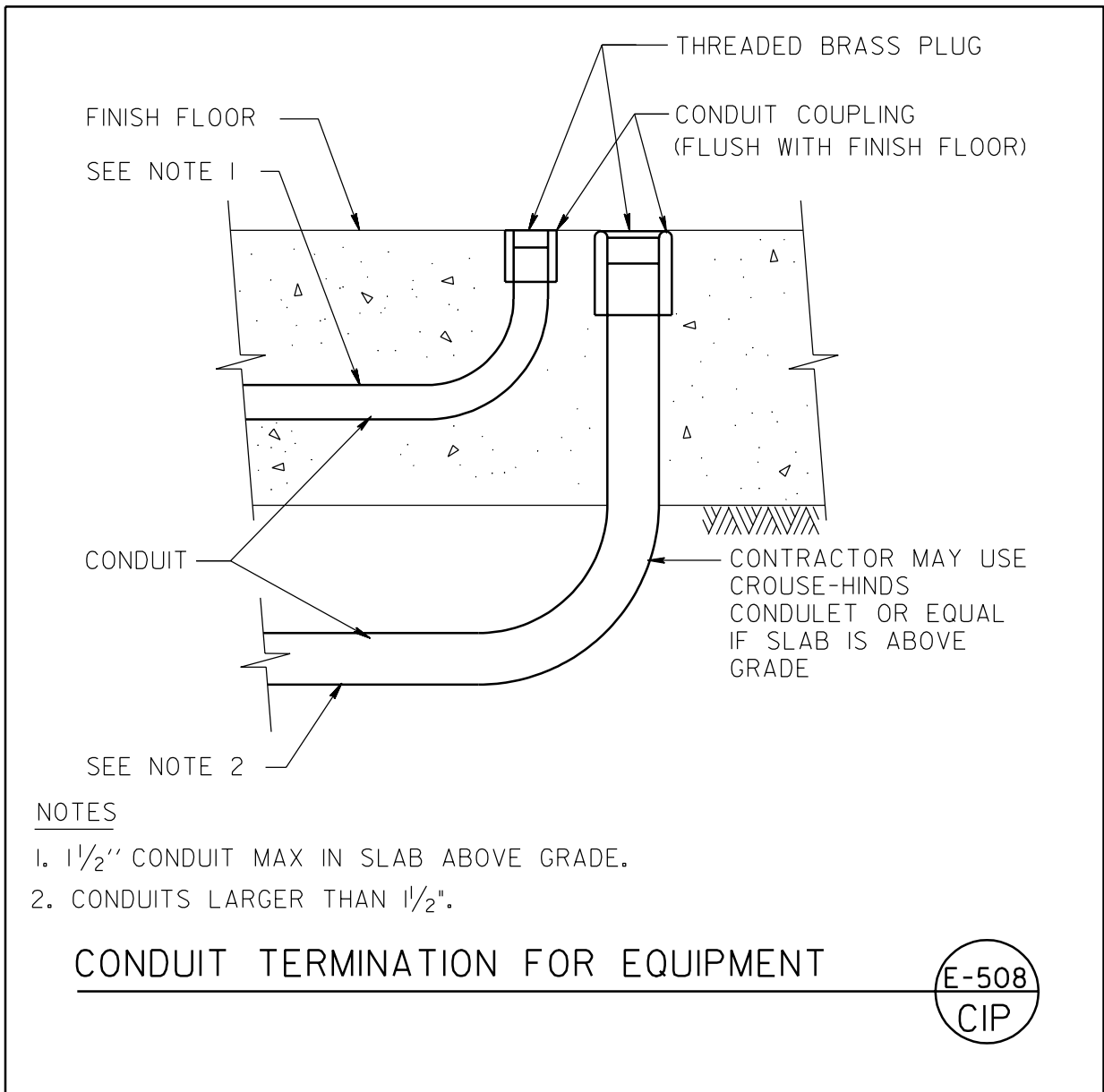
STANDARD  
DETAIL

CIP

EXPANSION COUPLING

E-507





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City of San Diego



**CONDUIT TERMINATION  
FOR EQUIPMENT**

STANDARD  
DETAIL

CIP

E-508

9" MINIMUM DIAMETER X 2" THICK  
COVER

PICK HOLES

$\frac{3}{4}$ " X 10'  
GROUND ROD

GRAVEL (3" THK  
LAYER)

CONDUIT  
(WHERE REQUIRED)

PRECAST VALVE BOX  
(SET TOP FLUSH WITH  
FINISH GRADE OR PAVING)  
BROOKS ISP OR EQUAL

GROUND CLAMP

10"

GROUND CABLES

BUSHING ( SEAL AROUND  
CABLE WITH COMPOUND )

## GROUND ROD AND WELL INSTALLATION

E-509  
CIP

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City of San Diego



STANDARD  
DETAIL

CIP

**GROUND ROD  
AND WELL INSTALLATION**

E-509

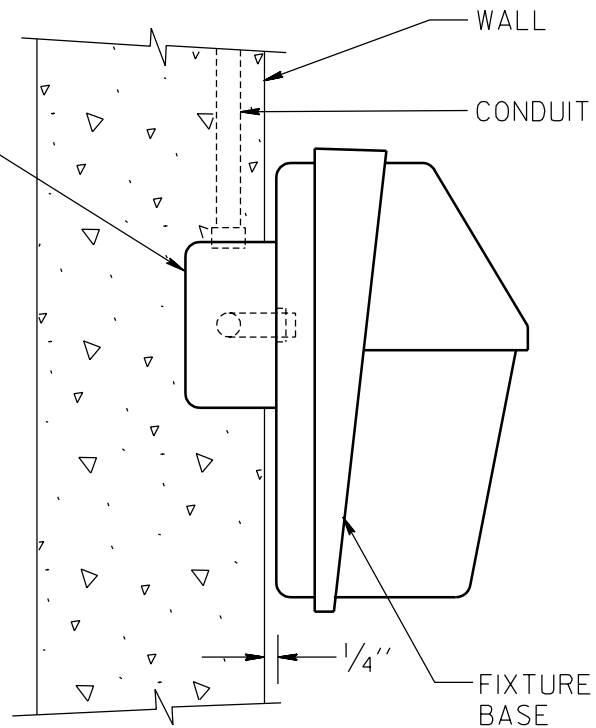
CAST OUTLET BOX

WALL

CONDUIT

NOTES:

1. PROVIDE CAST OUTLET BOX
2. SET BOX OUT FROM WALL AS SHOWN
3. PROVIDE GASKET BETWEEN BOX AND FIXTURE
4. INSTALLATION SHALL BE WATER-TIGHT



WALL HUNG FIXTURE MOUNTING

E-510  
CIP

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City of San Diego

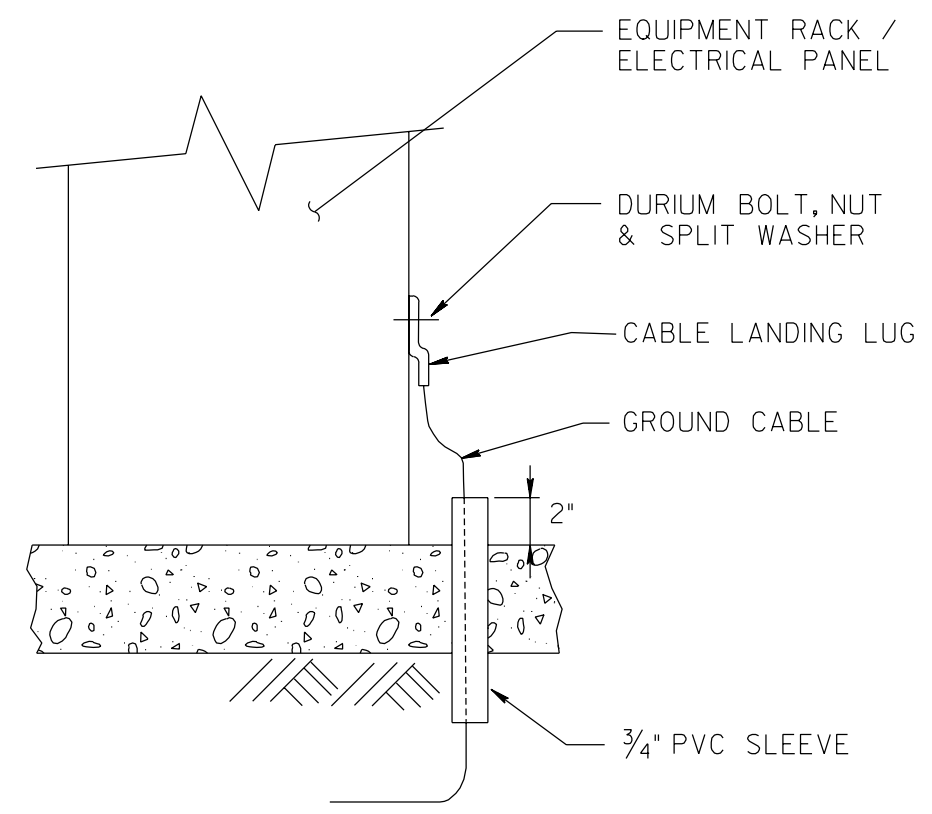
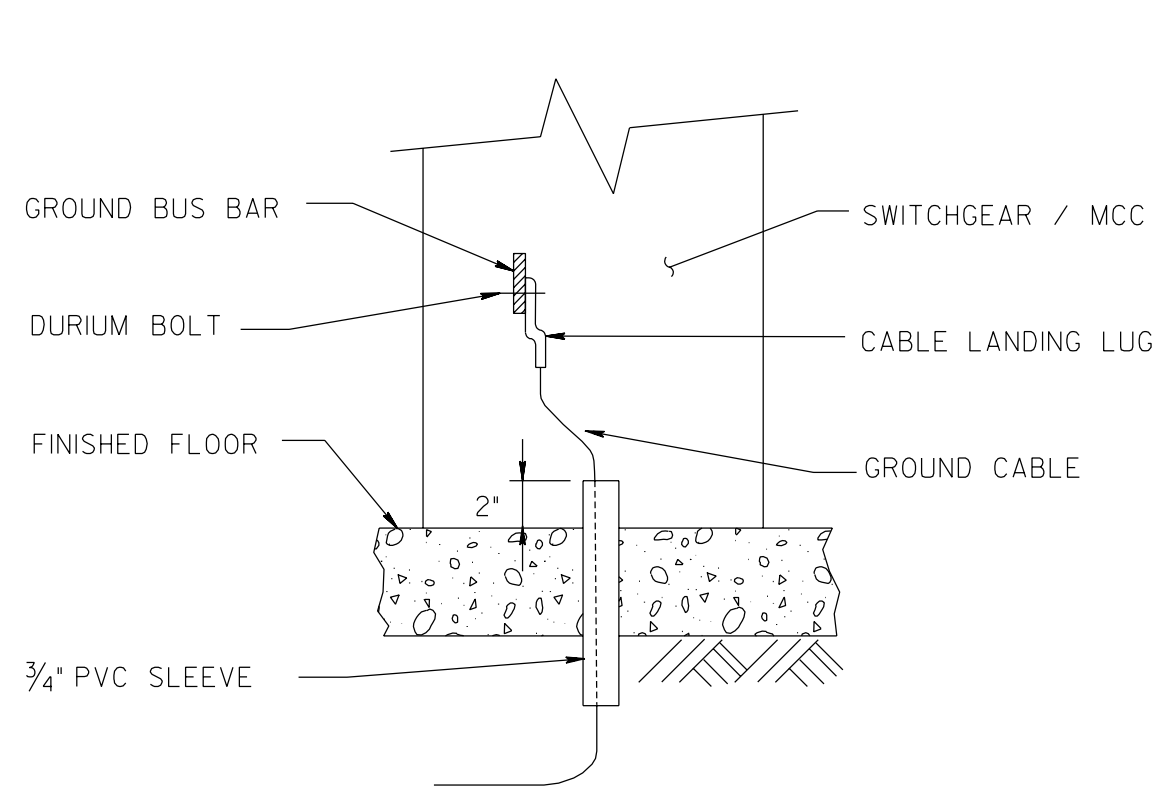


STANDARD  
DETAIL

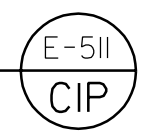
CIP

WALL HUNG FIXTURE MOUNTING

E-510



SWITCHGEAR/MCC/PANEL GROUNDING



NOT TO SCALE

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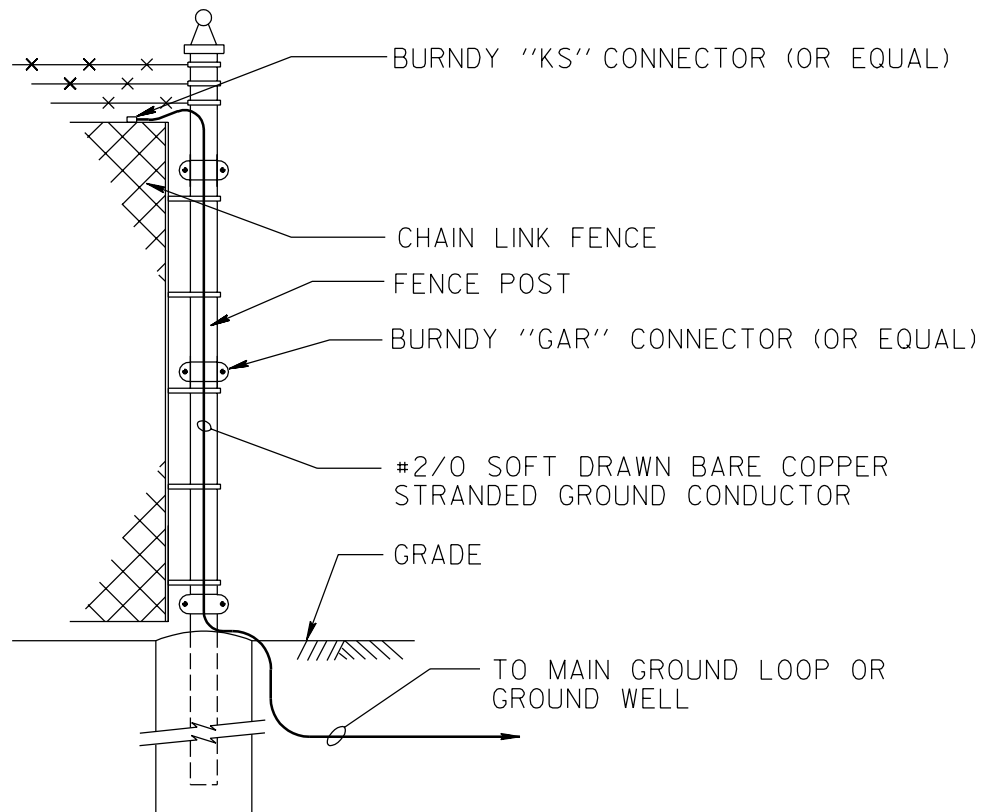
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SWITCHGEAR/MCC/PANEL GROUNDING

STANDARD DETAIL
CIP
E-5II



FENCE GROUNDING

E-512  
CIP

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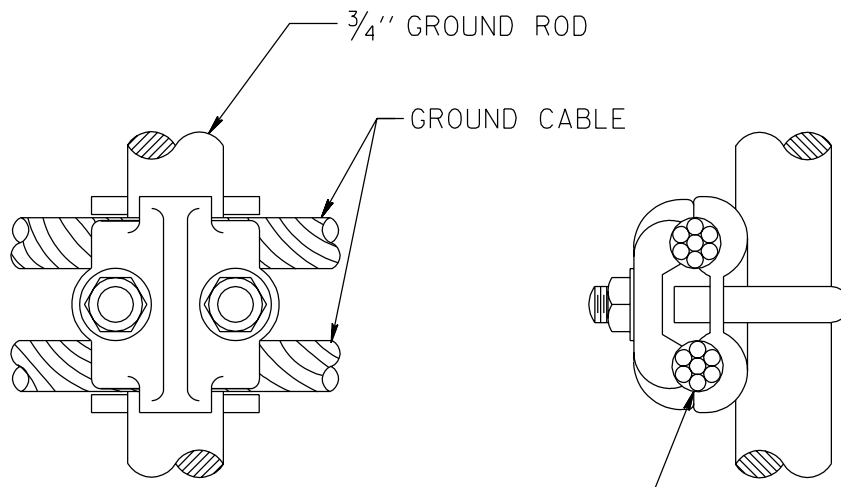


STANDARD  
DETAIL

CIP

FENCE GROUNDING

E-512



ROD TYPE CONNECTOR  
90° CABLE CONNECTION  
TO ROD OR PIPE. BURNDY  
TYPE "GP" GROUND  
CONNECTOR (OR EQUAL)

## CABLE TO ROD CONNECTION

E-513  
CIP

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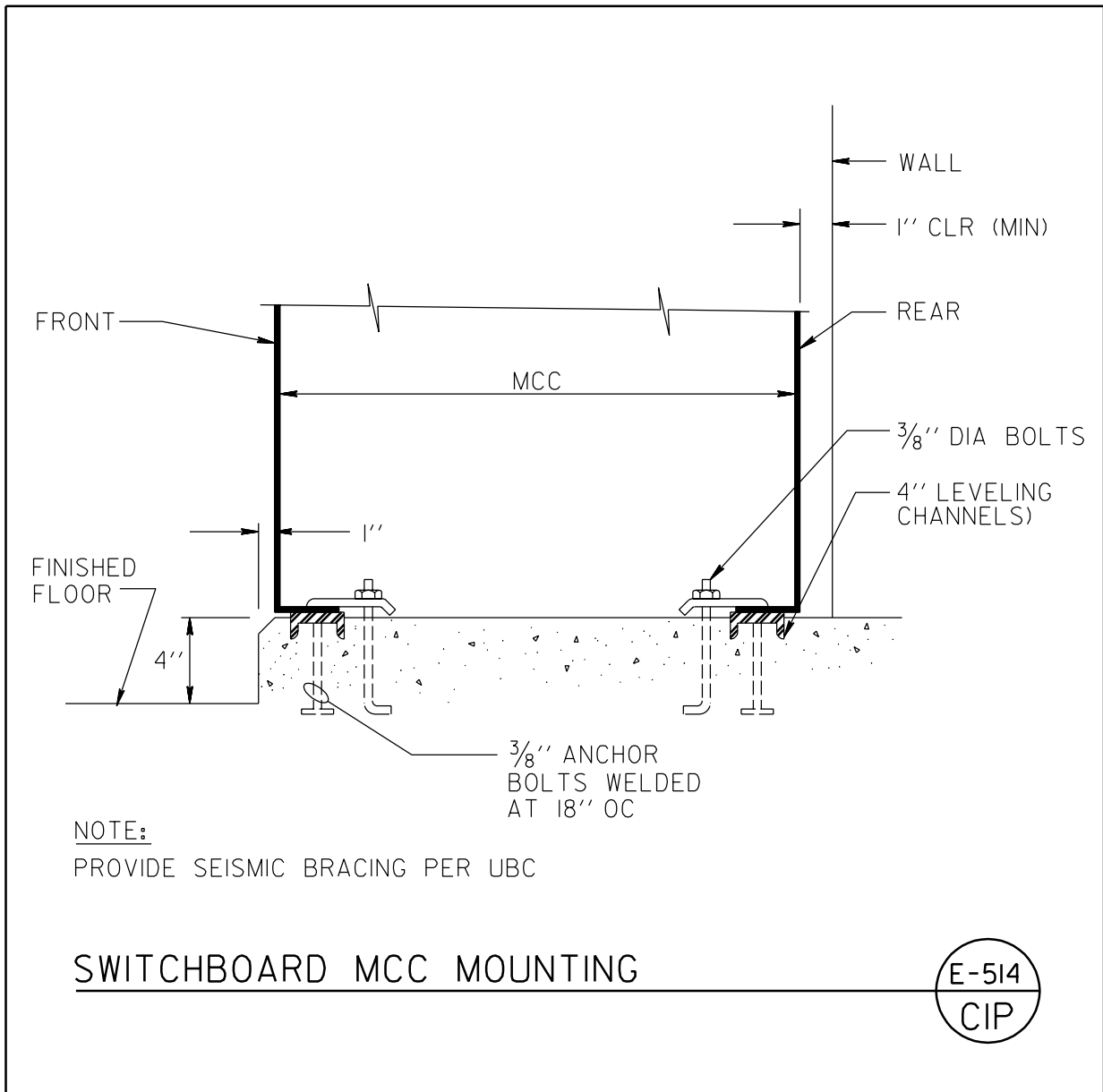


STANDARD  
DETAIL

CIP


CABLE TO ROD CONNECTION

E-513



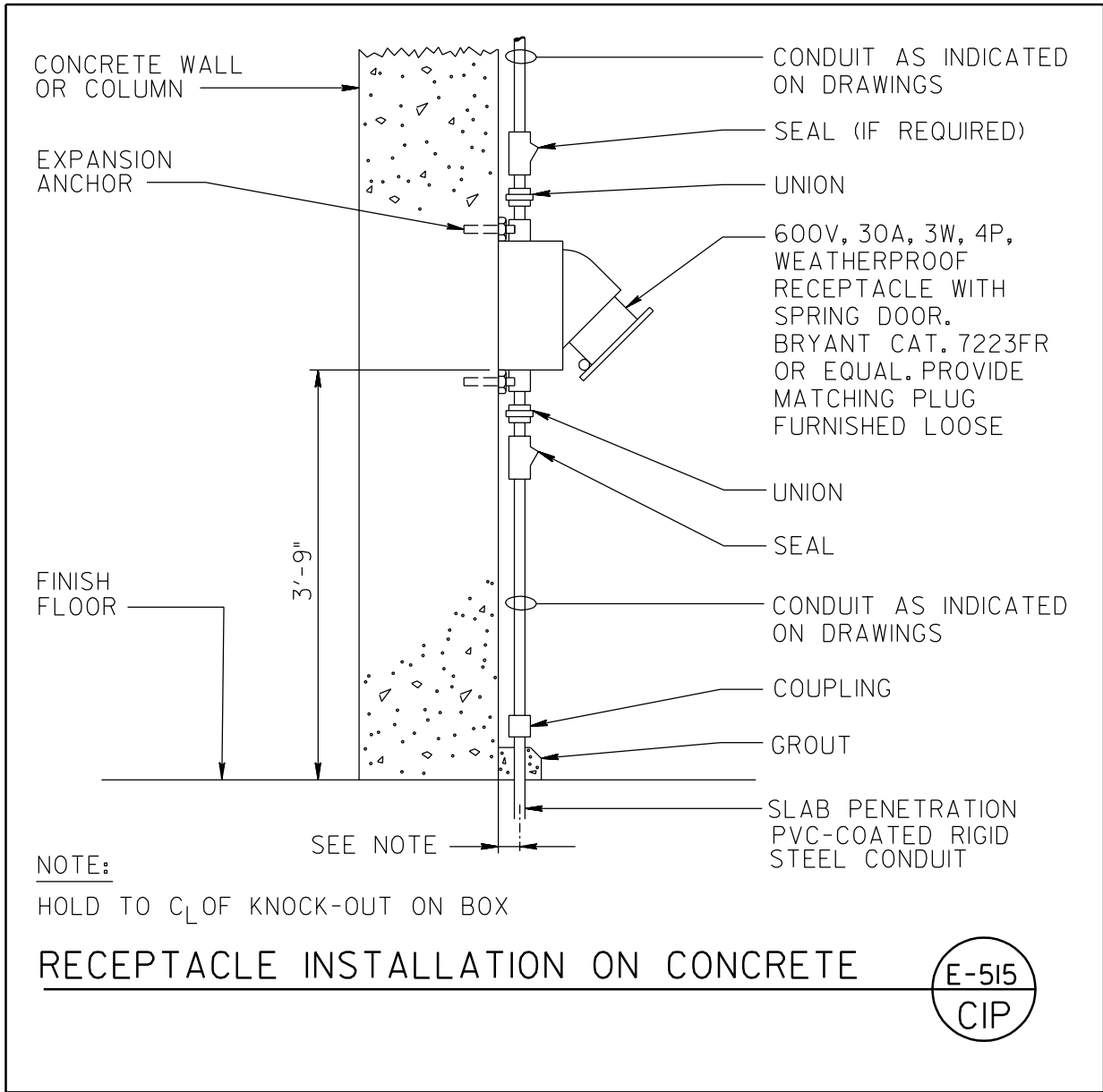
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**SWITCHBOARD MCC MOUNTING**

STANDARD DETAIL
CIP
E-514



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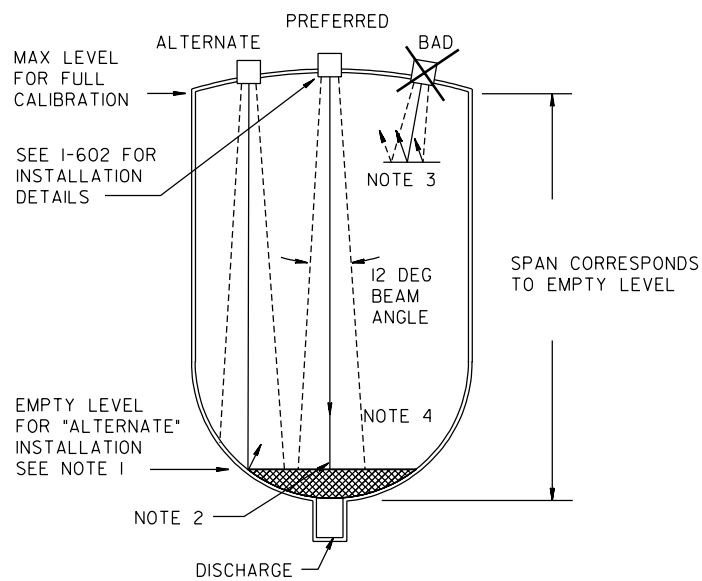
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City of San Diego



**RECEPTACLE INSTALLATION ON CONCRETE**

STANDARD DETAIL
CIP
E-515





NOTES:

1. BEAM SHOULD NOT DETECT BIN BOTTOM. USE RANGE EXTENSION PARAMETERS TO OMIT FALSE ECHOS IF THIS OCCURS. THE TRANSDUCER SHOULD BE CENTERED AS MUCH AS POSSIBLE (WITHOUT INTERFERENCE FROM INLET) FOR OPTIMUM READING RANGE.
2. SOUND BEAM MUST BE PERPENDICULAR TO LIQUID SURFACE.
3. ECHO HAS MISSED IMPROPERLY LEVELED TRANSDUCER.
4. TANK MUST BE AT NORMAL TEMPERATURE AND CONTAIN ITS NORMAL VAPOR WHEN PERFORMING EMPTY OR FULL CALIBRATION

ULTRASONIC LEVEL TRANSMITTER  
TANK INSTALLATION



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City of San Diego

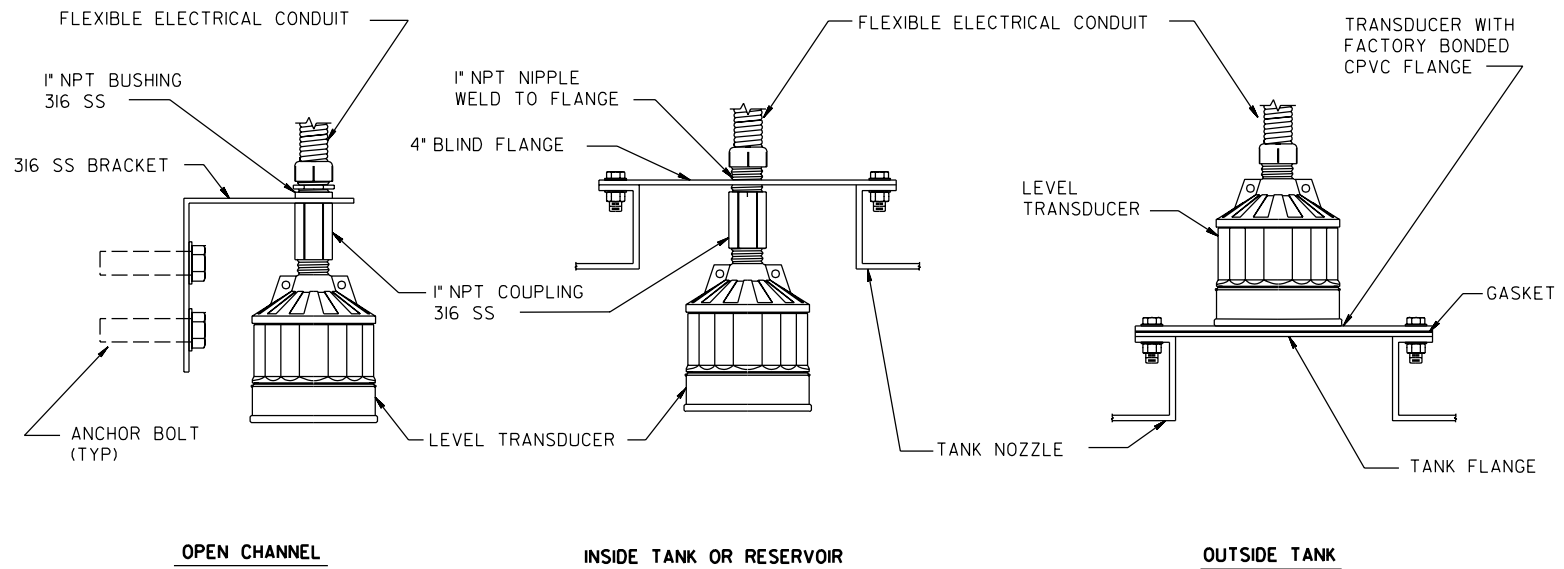


ULTRASONIC LEVEL INDICATION  
TANK INSTALLATION

STANDARD  
DETAIL

CIP

I-601



SCALE: NO SCALE

ULTRASONIC TRANSMITTER  
INSTALLATION DETAILS

I-602  
CIP

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City of San Diego

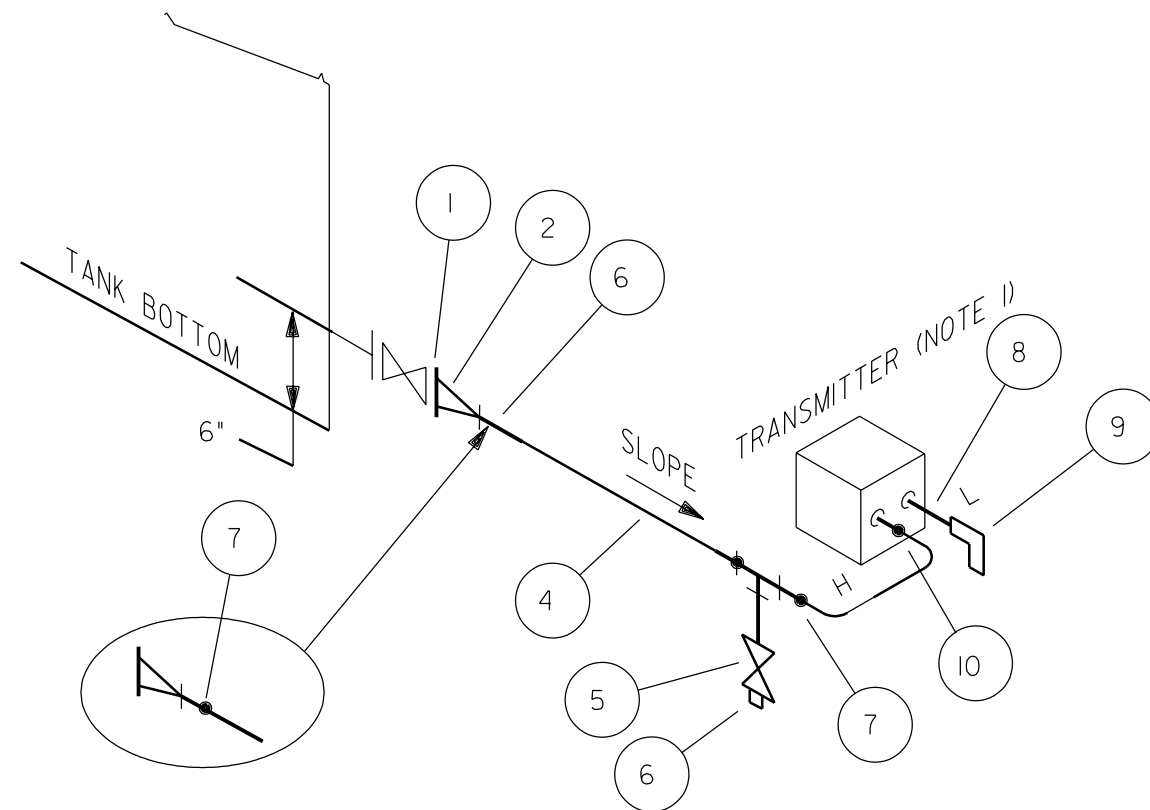


ULTRASONIC TRANSMITTER  
INSTALLATION DETAILS

STANDARD  
DETAIL

CIP

I-602



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	X" x 3/8"	1	RED. FLANGE
2	3/8" x 1/4"	1	SWAGE
3	1/4"	2	TEE
4	3/8"	A/R	TUBING
5	1/4"	1	VALVE
6	1/4"	2	PLUG
7	3/8" Tx 1/4" MNPT	3	CONNECTOR
8	1/4" x 3"	1	NIPPLE
9	1/2"	1	BUG VENT
10	3/8" Tx 1/2" MNPT	1	CONNECTOR
11			
12			
13			
14			
15			

NOTES:  
1. AIR BLEED VALVE IS INTEGRAL WITH THE TRANSMITTER.

LEVEL TRANSMITTER-REMOTE MOUNTED  
ATMOSPHERIC REFERENCE


1-603  
CIP

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City of San Diego

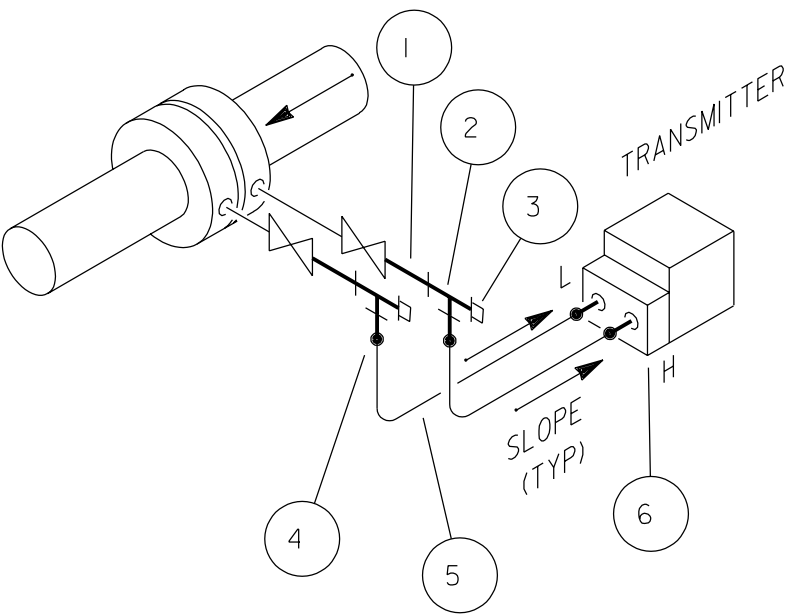


LEVEL TRANSMITTER-REMOTE MTD.  
ATMOSPHERIC REFERENCE

STANDARD  
DETAIL

CIP

1-603



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	1/2"x3"	2	NIPPLE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8" T x 1/2" MNPT	4	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	3-VA MANIFOLD
7			
8			
9			
10			
11			
12			
13			
14			
15			

FLOW TRANSMITTER-LINE MOUNTED  
LIQUID SERVICE

I-604  
CIP

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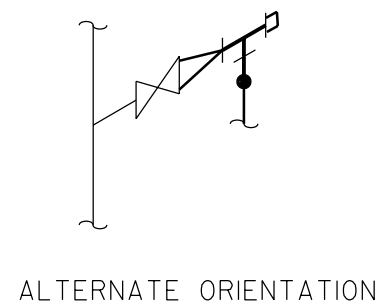
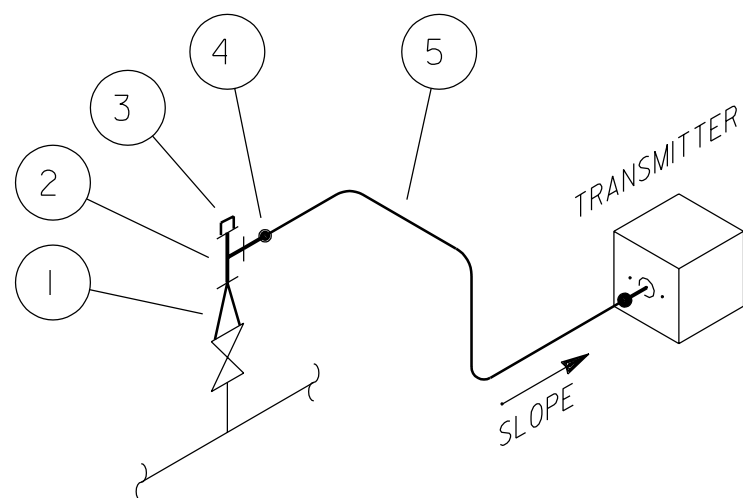
WATER DEPARTMENT

City of San Diego



FLOW TRANSMITTER-LINE MOUNTED  
LIQUID SERVICE

STANDARD DETAIL
CIP
I-604



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	1	SWAGE
2	1/2"	1	TEE
3	1/2"	1	PLUG
4	3/8" Tx 1/2" MNPT	2	CONNECTOR TXMP
5	3/8"	A/R	TUBING
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

PRESSURE TRANSMITTER-LINE MOUNTED  
LIQUID SERVICE

I-605  
CIP

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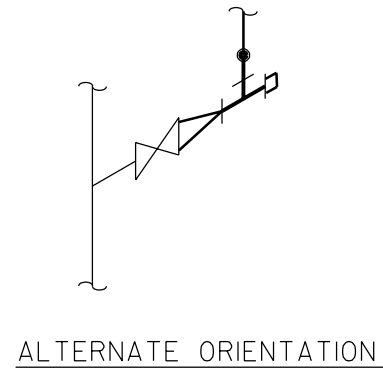
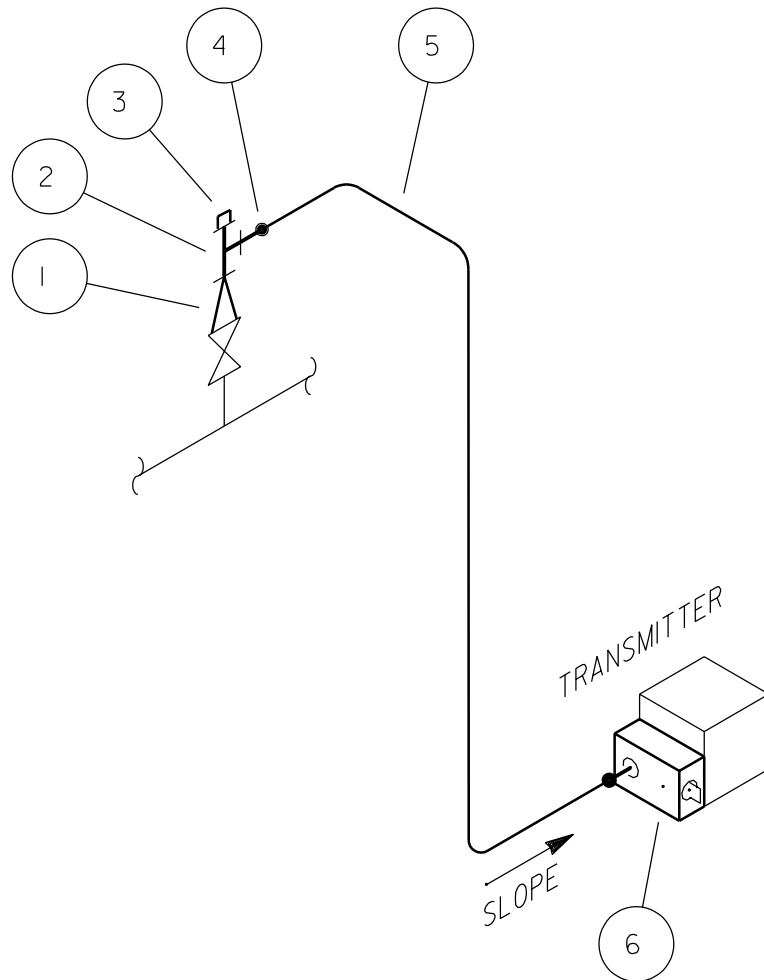
WATER DEPARTMENT

City of San Diego



PRESSURE TRANSMITTER-LINE MOUNTED  
LIQUID SERVICE

STANDARD DETAIL
CIP
I-605



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	1	SWAGE
2	1/2"	1	TEE
3	1/2"	2	PLUG
4	3/8" T x 1/2" MNPT	2	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	2-VA MANIFOLD
7			
8			
9			
10			
11			
12			
13			
14			
15			

PRESSURE TRANSMITTER-REMOTE MOUNTED  
LIQUID SERVICE

I-606  
CIP

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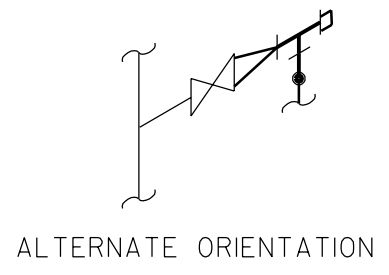
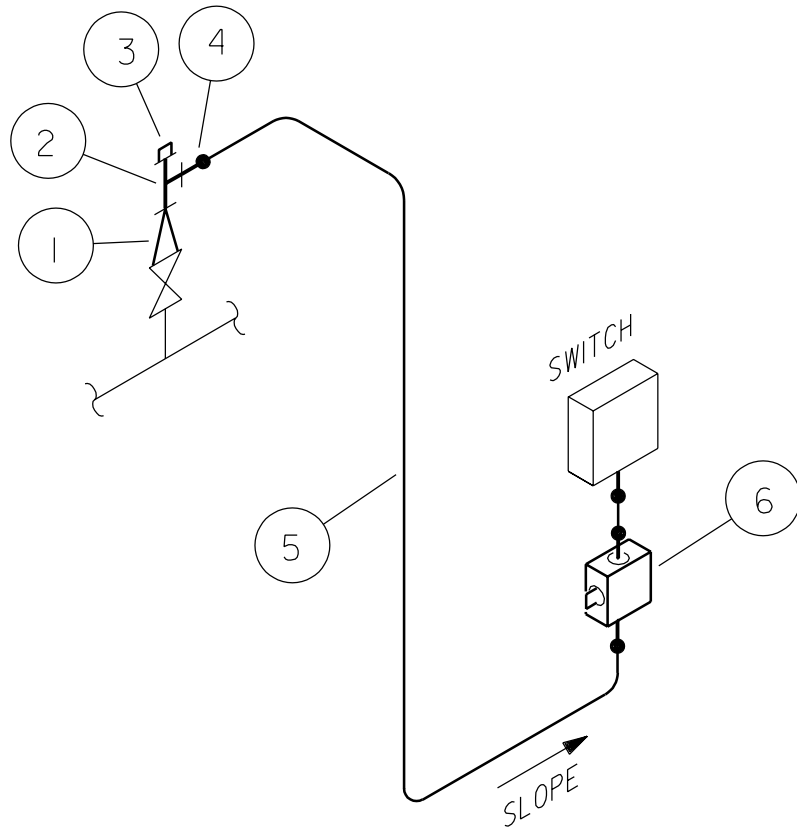
WATER DEPARTMENT

City of San Diego



PRESSURE TRANSMITTER-REMOTE MOUNTED  
LIQUID SERVICE

STANDARD DETAIL
CIP
I-606



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" X 1/2"	1	SWAGE
2	1/2"	1	TEE
3	1/2"	2	PLUG
4	3/8" T x 1/2" MNPT	4	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	2-VA MANIFOLD
7			
8			
9			
10			
11			
12			
13			
14			
15			

PRESSURE SWITCH-REMOTE MOUNTED  
LIQUID SERVICE

I-607  
CIP

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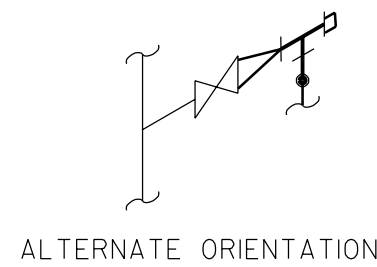
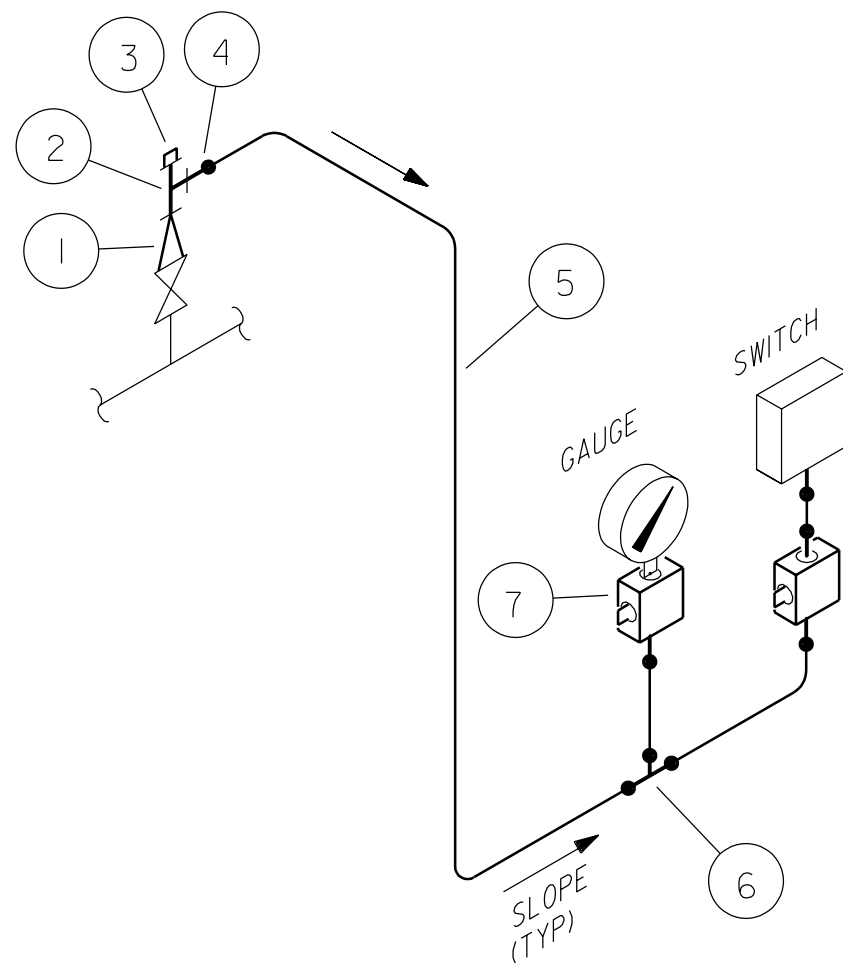
WATER DEPARTMENT

City of San Diego



PRESSURE SWITCH-REMOTE MOUNTED  
LIQUID SERVICE

STANDARD DETAIL
CIP
I-607



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	1	SWAGE
2	1/2"	1	TEE
3	1/2"	3	PLUG
4	3/8"Tx1/2"MNPT	5	CONNECTOR
5	3/8"	A/R	TUBING
6	3/8"	1	TUBING TEE
7	1/2"	2	2-VA MANIFOLD
8			
9			
10			
11			
12			
13			
14			
15			

PRESSURE SWITCH W/ GAUGE  
LIQUID SERVICE

I-608  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT

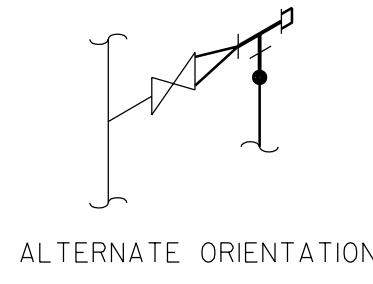
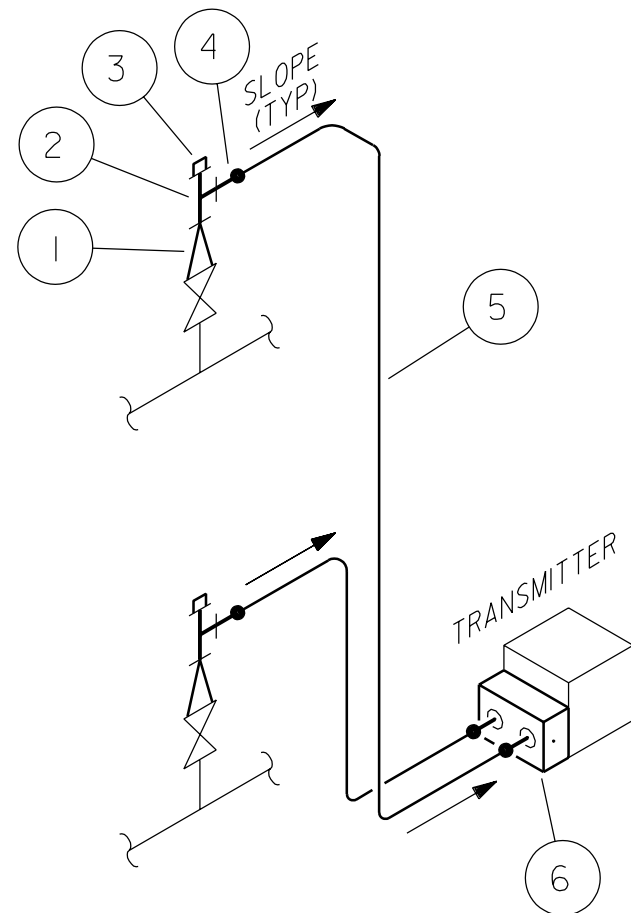
City of San Diego



PRESSURE SWITCH W/ GAUGE  
LIQUID SERVICE

STANDARD DETAIL
CIP
I-608





LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	2	SWAGE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8"Tx1/2"MNPT	4	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	3-VA MANIFOLD
7			
8			
9			
10			
11			
12			
13			
14			
15			

D/P TRANSMITTER-REMOTE MOUNTED  
LIQUID SERVICE

I-609  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

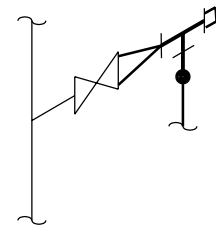
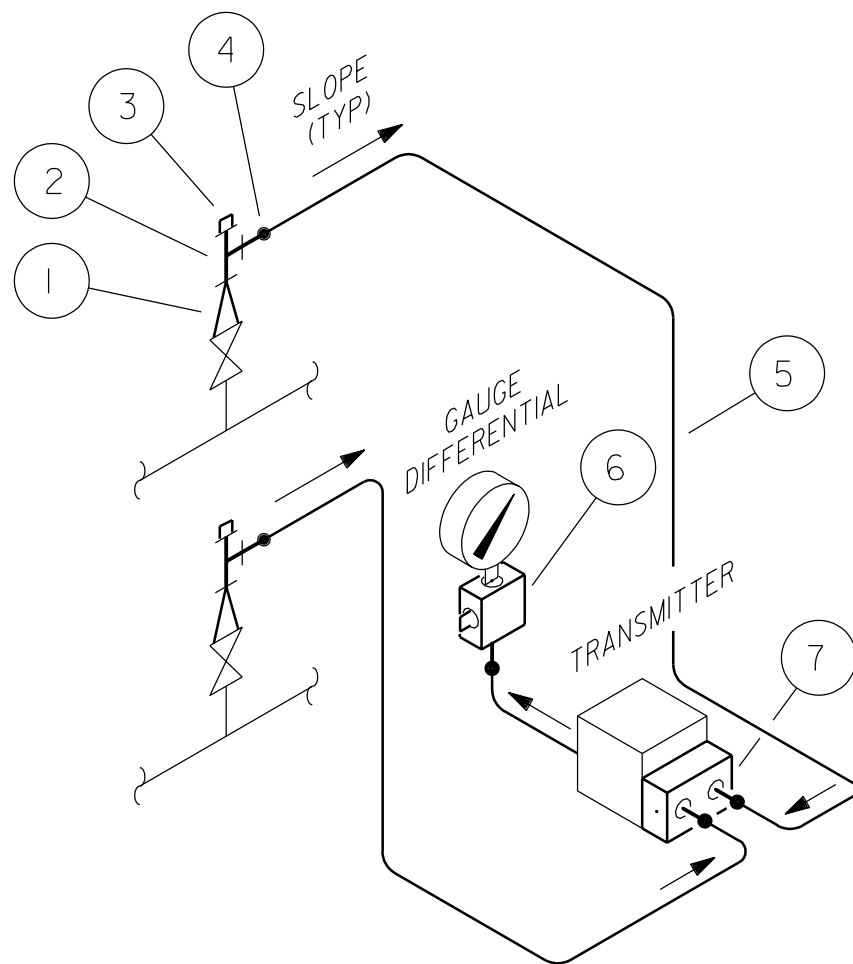
WATER DEPARTMENT

City of San Diego



D/P TRANSMITTER-REMOTE MOUNTED  
LIQUID SERVICE

STANDARD DETAIL
CIP
I-609



ALTERNATE ORIENTATION

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	2	SWAGE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8Tx1/2"MNPT	6	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	2-VA MANIFOLD
7	1/2"	1	3-VA MANIFOLD
8			
9			
10			
11			
12			
13			
14			
15			

D/P TRANSMITTER W/ GAUGE  
LIQUID SERVICE

I-610  
CIP

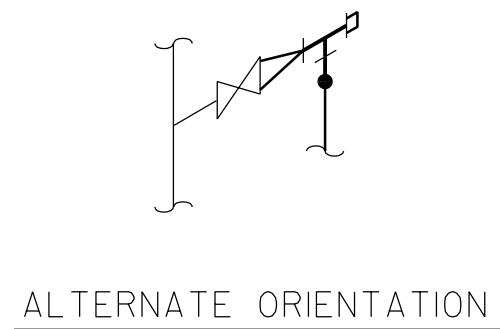
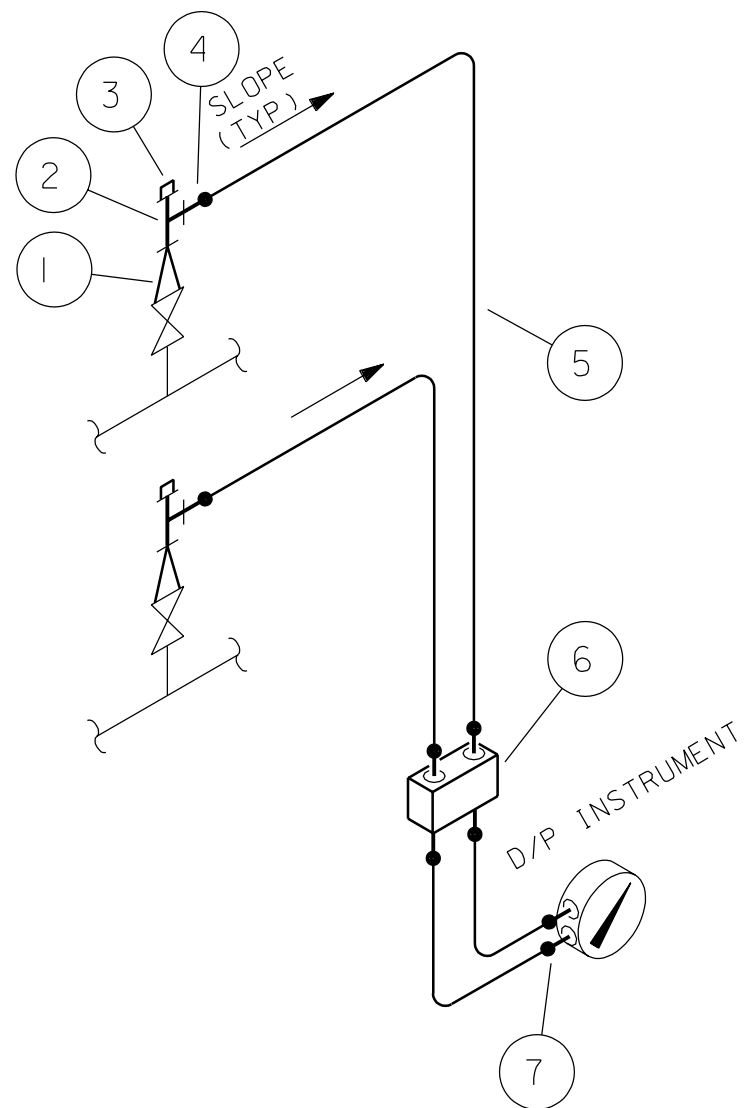
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REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego



D/P TRANSMITTER W/ GAUGE  
LIQUID SERVICE

STANDARD  
DETAIL  
CIP  
I-610



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	3/4" x 1/2"	2	SWAGE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8"Tx1/2"MNPT	6	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	3-VA MANIFOLD
7	3/8"Tx1/8"MNPT	2	RED.CONN.
8			
9			
10			
11			
12			
13			
14			
15			


INSTRUMENT INSTALLATION DETAIL  
D/P INDICATOR-REMOTE MOUNTED

I-611  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

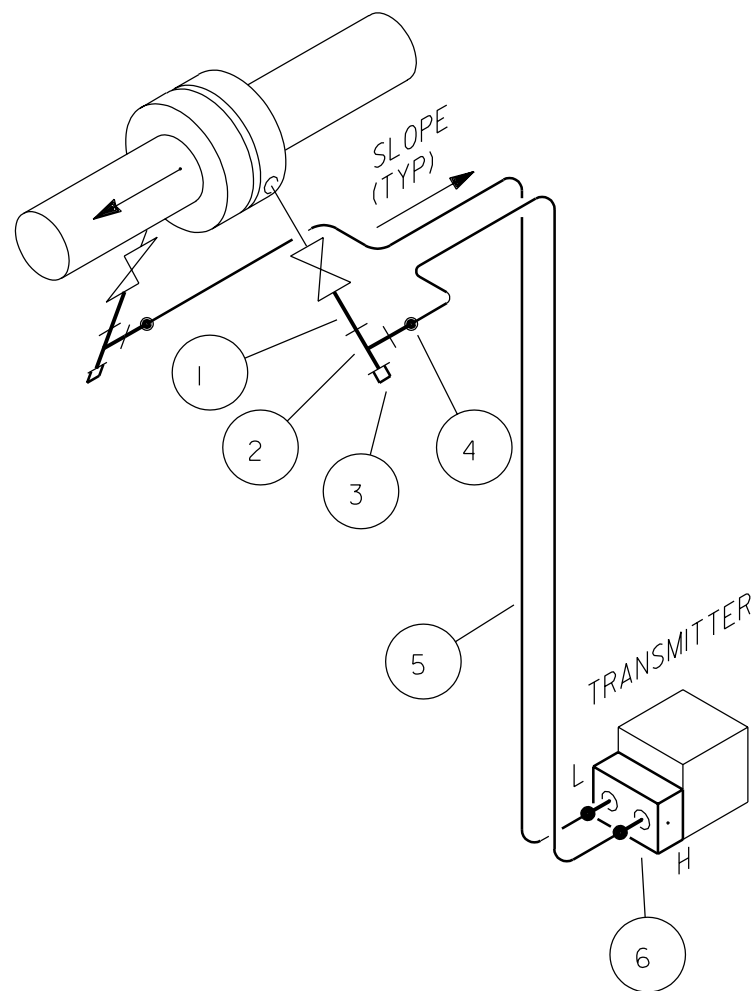
WATER DEPARTMENT

City of San Diego



INSTRUMENT INSTALLATION DETAIL  
D/P INDICATOR-REMOTE MOUNTED

STANDARD DETAIL
CIP
I-611



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	1/2"x3"	2	NIPPLE
2	1/2"	2	TEE
3	1/2"	2	PLUG
4	3/8"Tx1/2"MNPT	4	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"	1	3-VA MANIFOLD
7			
8			
9			
10			
11			
12			
13			
14			
15			

FLOW TRANSMITTER-REMOTE MOUNTED  
LIQUID SERVICE

I-612  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

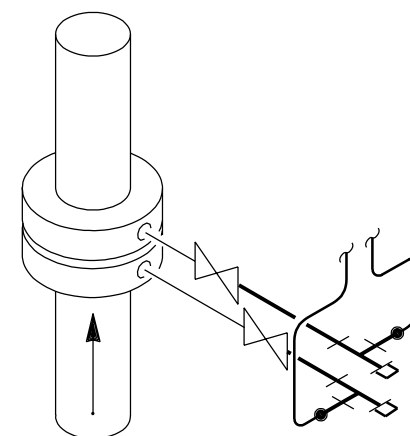
WATER DEPARTMENT

City of San Diego



FLOW TRANSMITTER-REMOTE MOUNTED  
LIQUID SERVICE

STANDARD DETAIL
CIP
I-612



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	1/2"x6"	2	NIPPLE
2	1/2"	4	TEE
3	1/2"	4	PLUG
4	3/8"Tx1/2" MNPT	2	CONNECTOR
5	3/8"	A/R	TUBING
6	1/2"x3"	1	NIPPLE
7	1/4"	2	VALVE
8	3/8"Tx1/2" MNPT	2	ELBOW
9	1/2"	1	3-VA MANIFOLD
10	3/8"Tx1/4" MNPT	2	CONNECTOR
11	1/4" x 6"	2	NIPPLE
12			
13			
14			
15			

FLOW TRANSMITTER-REMOTE MTD.

---

LIQUID SERVICE-ABOVE TAPS

1-613  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY		INITIALS	DATE

WATER DEPARTMENT  
City of San Diego

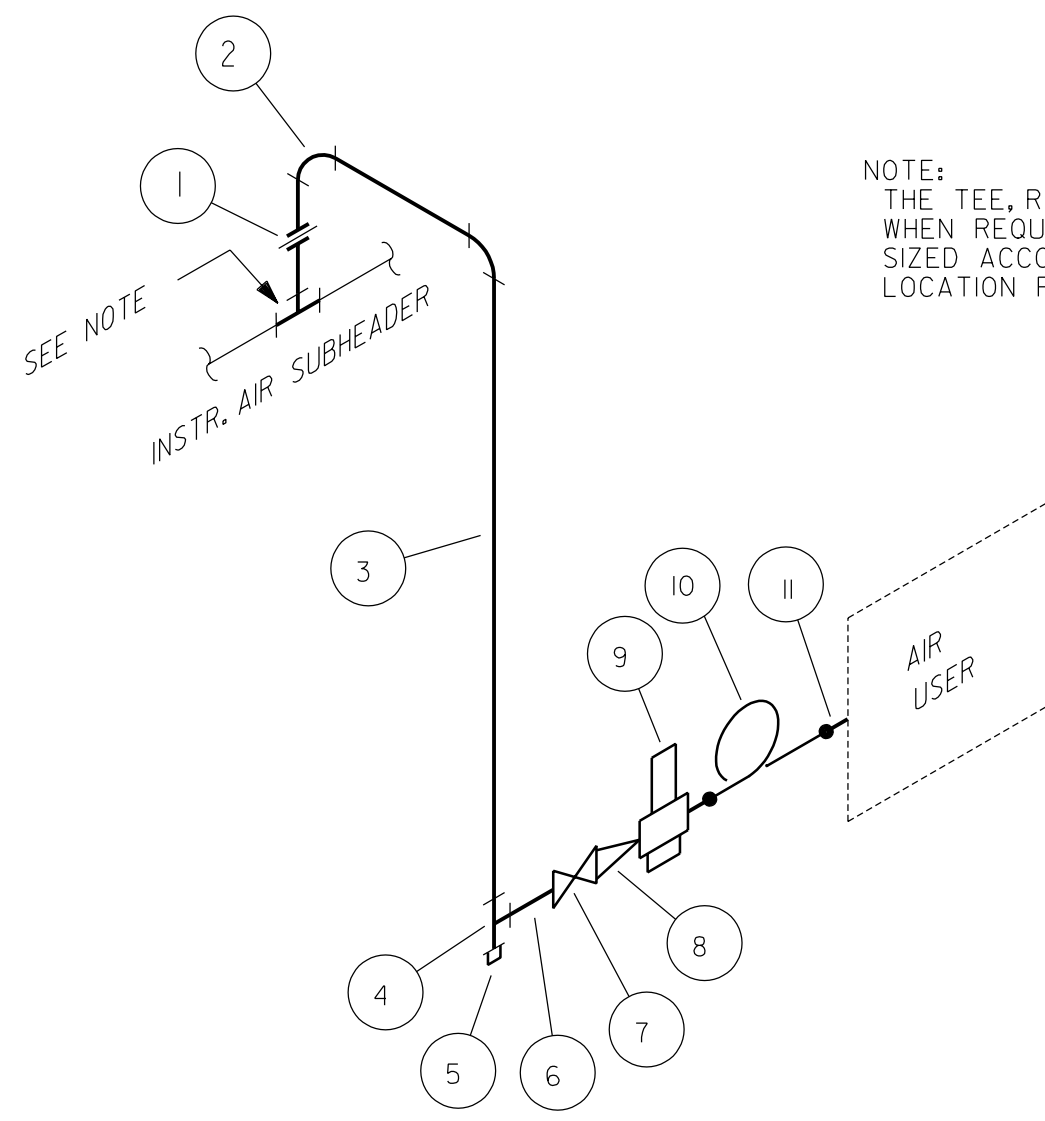


FLOW TRANSMITTER-REMOTE MOUNTED  
LIQUID SERVICE-ABOVE TAPS

STANDARD  
DETAIL

CIP

1-613




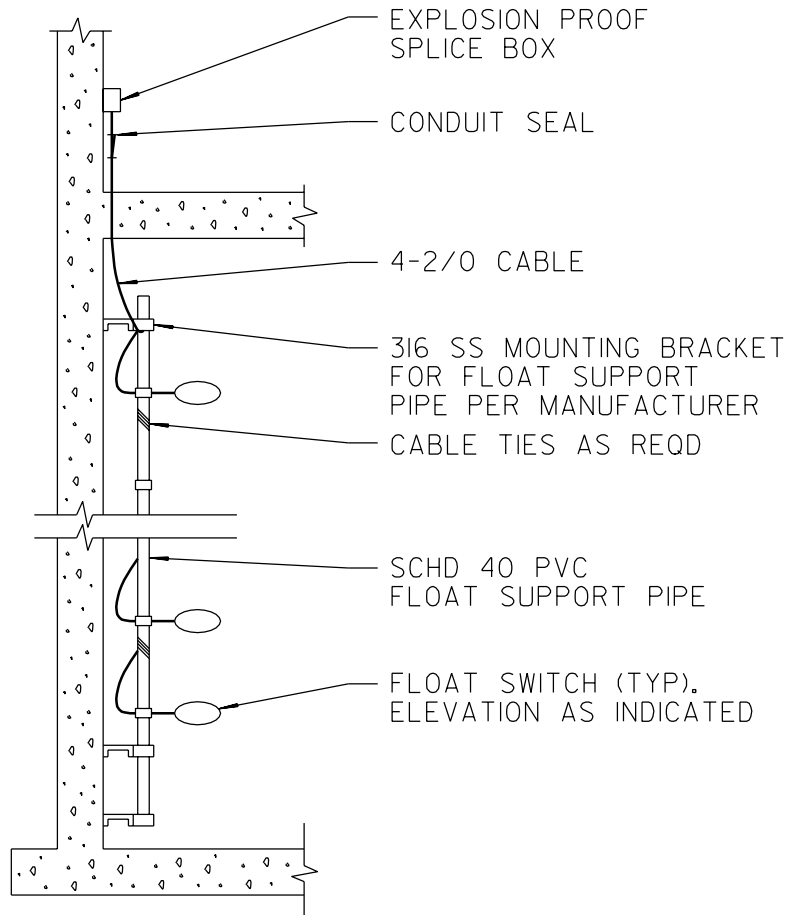
NOTE:  
THE TEE, REDUCING TEE  
WHEN REQUIRED, SHALL BE  
SIZED ACCORDING TO THE  
LOCATION PLAN DRAWING.

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	1/2"	1	UNION
2	1/2"	2	ELBOW
3	1/2"	25'	PIPE
4	1/2"	1	TEE
5	1/2"	1	PLUG
6	1/2"x3"	2	NIPPLE
7	1/2"	1	VALVE
8	1/4"x1/2"	1	SWAGE
9	1/4"	1	FILTER REGULATOR
10	1/4"	5'	TUBING
11			
12			
13			
14			
15			

INSTRUMENT AIR SUPPLY TAKEOFF  
W/ FILTER REGULATOR

I-614  
CIP

REVISION	BY	APPROVED	DATE	<b>WATER DEPARTMENT</b> City of San Diego			STANDARD DETAIL
							CIP
REVIEWED BY	INITIALS	DATE					I-614
				INSTRUMENT AIR SUPPLY TAKEOFF W/ FILTER REGULATOR			



**BALL FLOAT SWITCH**

I-615  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

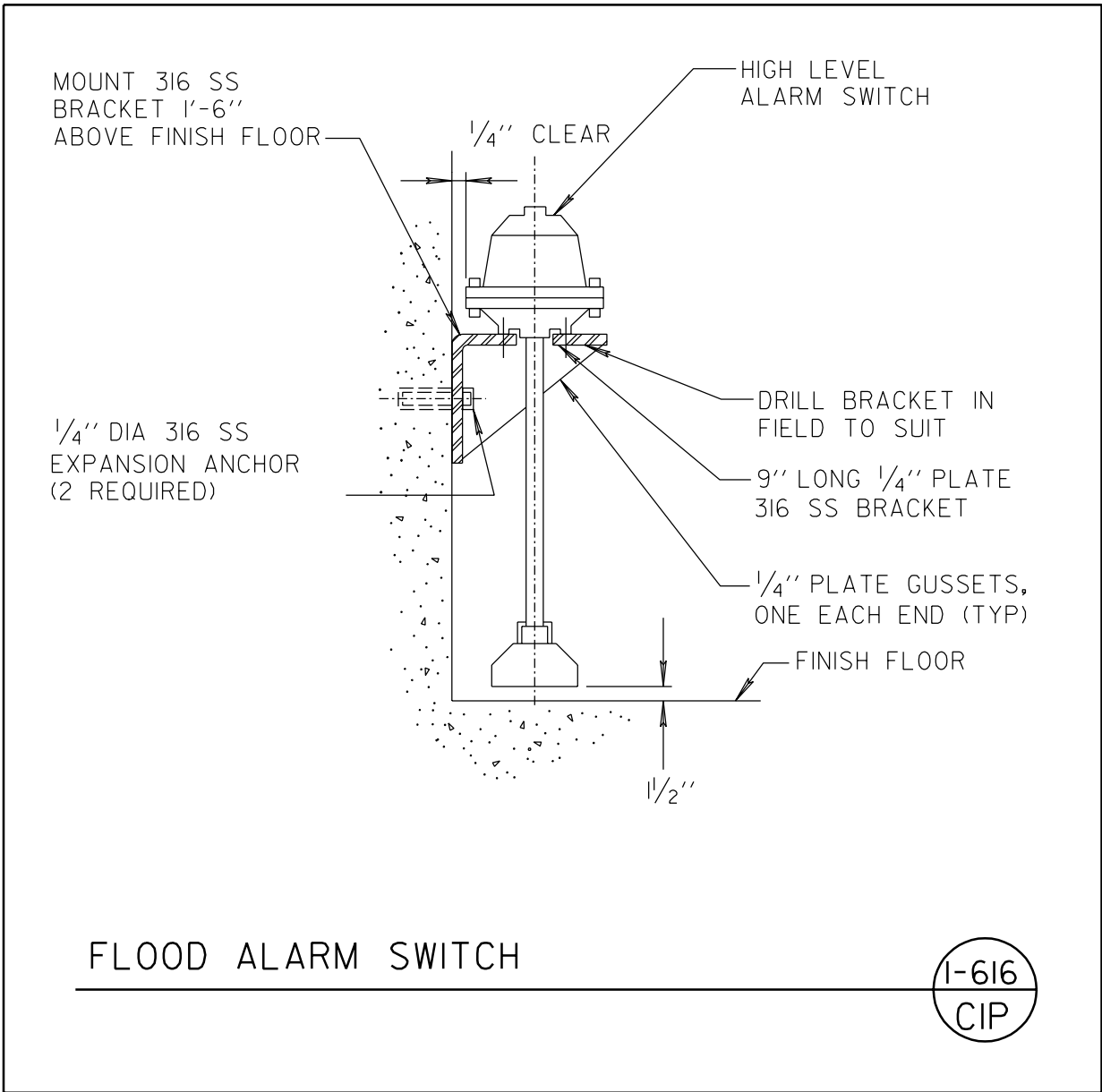


STANDARD  
DETAIL

CIP

**BALL FLOAT SWITCH**

I-615



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



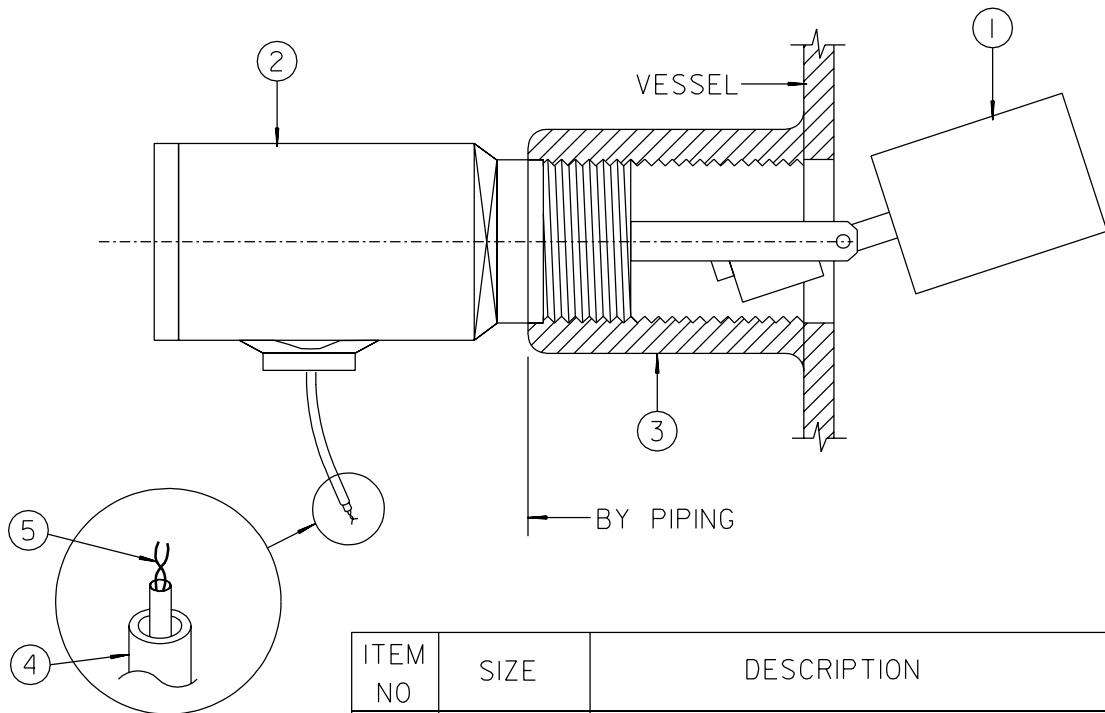
STANDARD  
DETAIL

CIP

**FLOOD ALARM SWITCH**

1-616





ITEM NO	SIZE	DESCRIPTION
1		FLOAT
2		SWITCH HOUSING
3	2"	THREADED COUPLING
4	1/2"	FLEXIBLE CONDUIT
5		#16 AWG TWISTED, SHIELDED PAIR

FLOAT SWITCH

I-617

CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

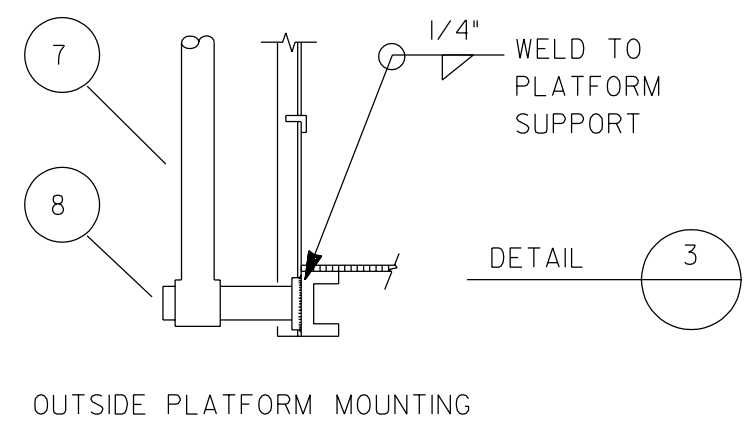
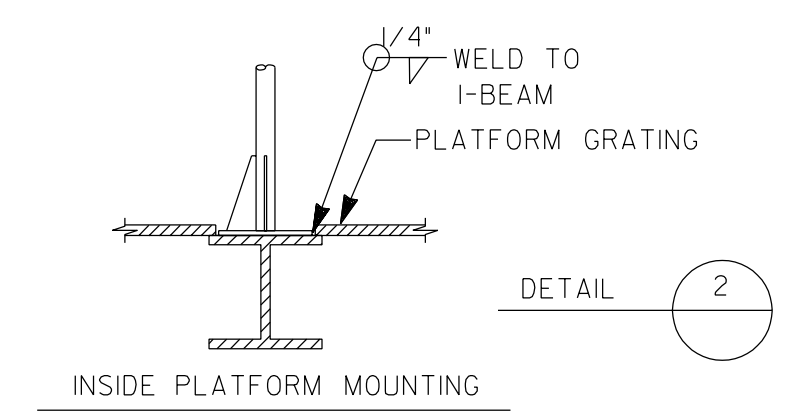
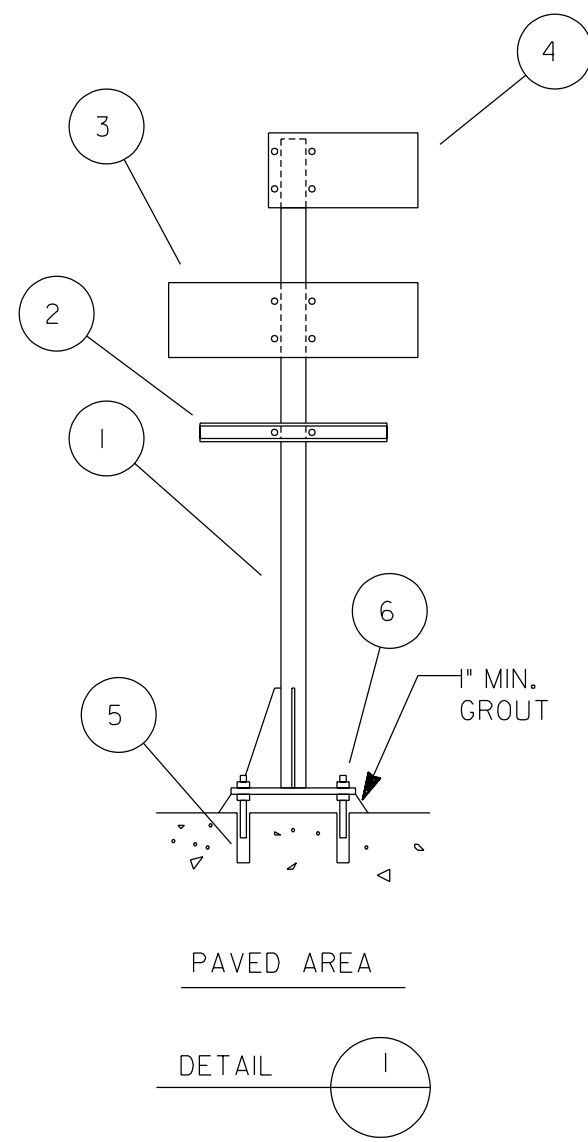


STANDARD  
DETAIL

CIP

FLOAT SWITCH

I-617



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x40"	1	GALV STL PIPE
2	15"	1	2"X2" UNISTRUT
3	6"x20"	1	3/16" THK STL PLATE
4	6"x12"	1	3/16" THK STL PLATE
5	1/2"	4	CINCH ANCHOR,GALV
6	1/2"x5"	4	STUD BOLT,GALV
7	2"x48"	1	PEDESTAL,GALV STL
8	2"x48"	1	BRACKET,GALV STL
9			
10			
11			
12			
13			
14			
15			


INSTRUMENT SUPPORT  
SINGLE MOUNTING

1-618  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

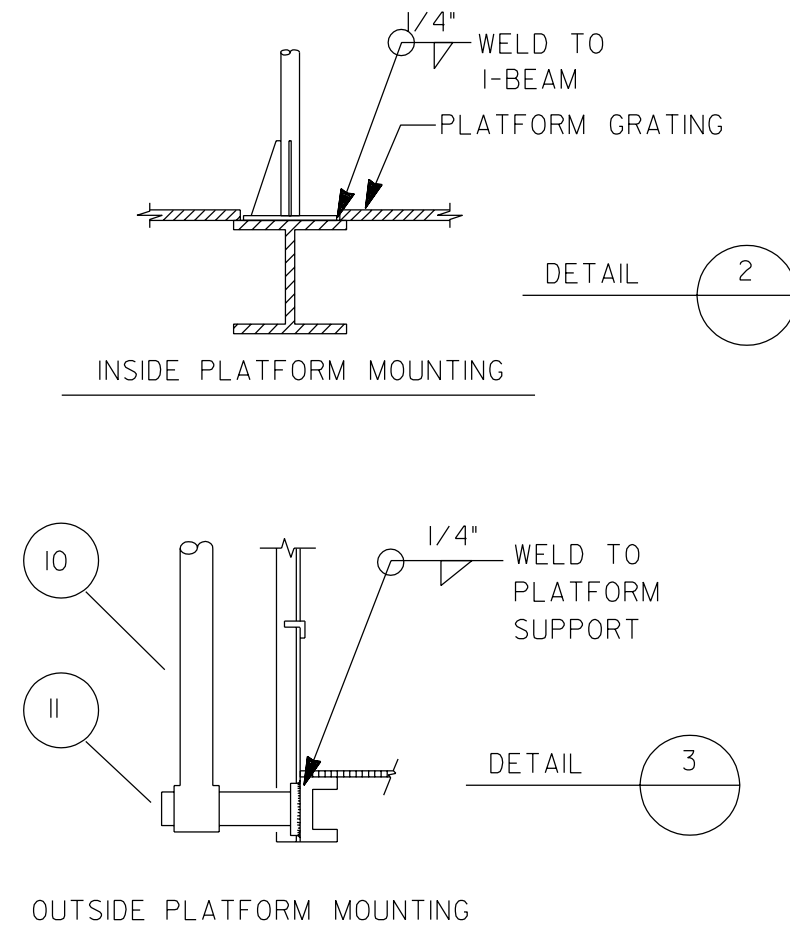
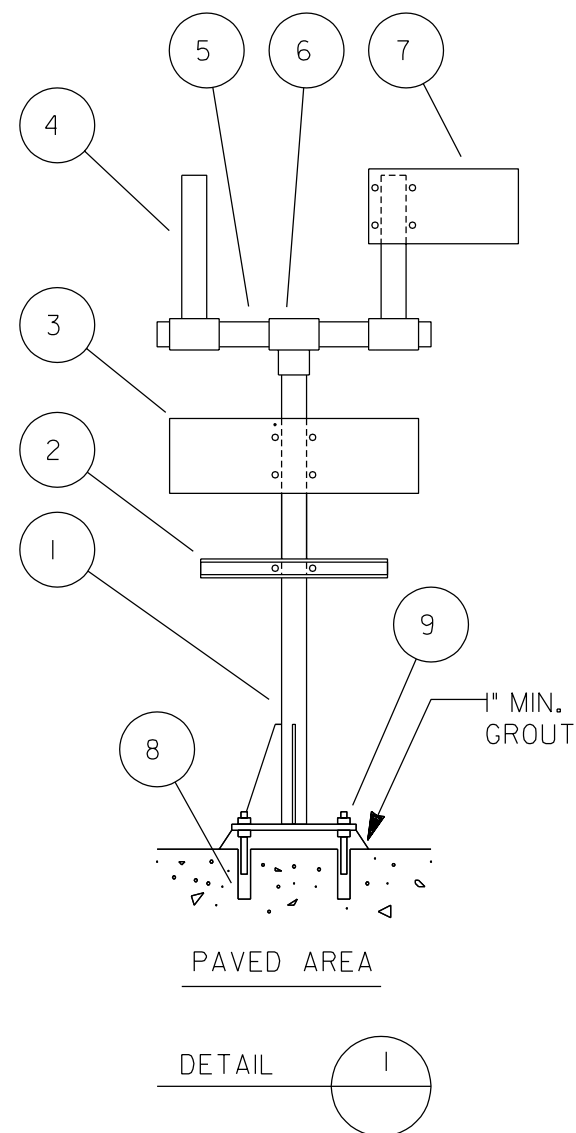
WATER DEPARTMENT

City of San Diego



INSTRUMENT SUPPORT  
SINGLE MOUNTING

STANDARD DETAIL
CIP
1-618



LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x40"	1	GALV STL PIPE
2	15"	1	2"x2" UNISTRUT
3	6"x20"	1	3/16" THK STL PLATE
4	2" DIA	2	GALV STL PIPE
5	2" DIA	1	PIPE NIPPLE
6	2" DIA	1	FEMALE ADAPTER
7	6"x12"	1	3/16" THK STL PLATE
8	1/2"	4	CINCH ANCHOR
9	1/2"x5"	4	STUD BOLT
10	2"x48"	1	GALV STL PIPE
11	2" DIA	1	BRACKET, GALV STL
12			
13			
14			
15			

# INSTRUMENT SUPPORT DOUBLE MOUNTING

I-619  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego

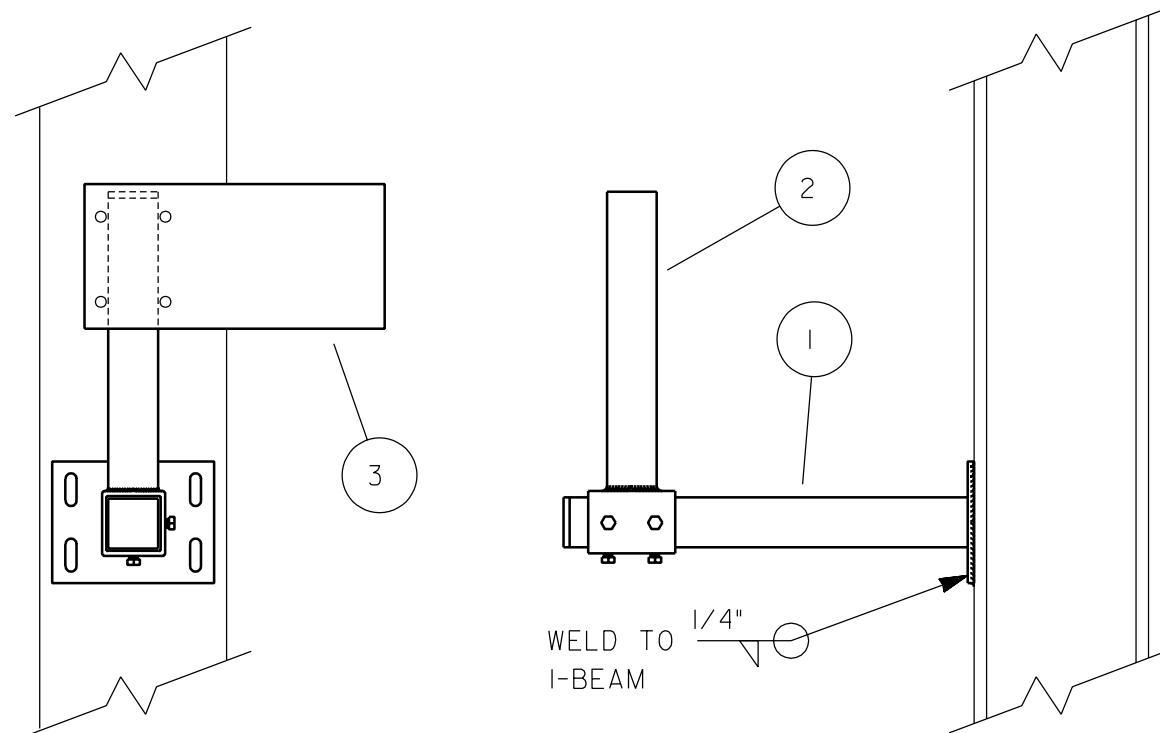


INSTRUMENT SUPPORT  
DOUBLE MOUNTING

STANDARD  
DETAIL

CIP

I-619



STEEL COLUMN

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x16"	1	GALV STL PIPE
2	2"x12"	1	GALV STL PIPE
3	6"x12"	1	3/16" THK STL PLATE
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			


INSTRUMENT SUPPORT  
SINGLE COLUMN MOUNTING

I-620  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

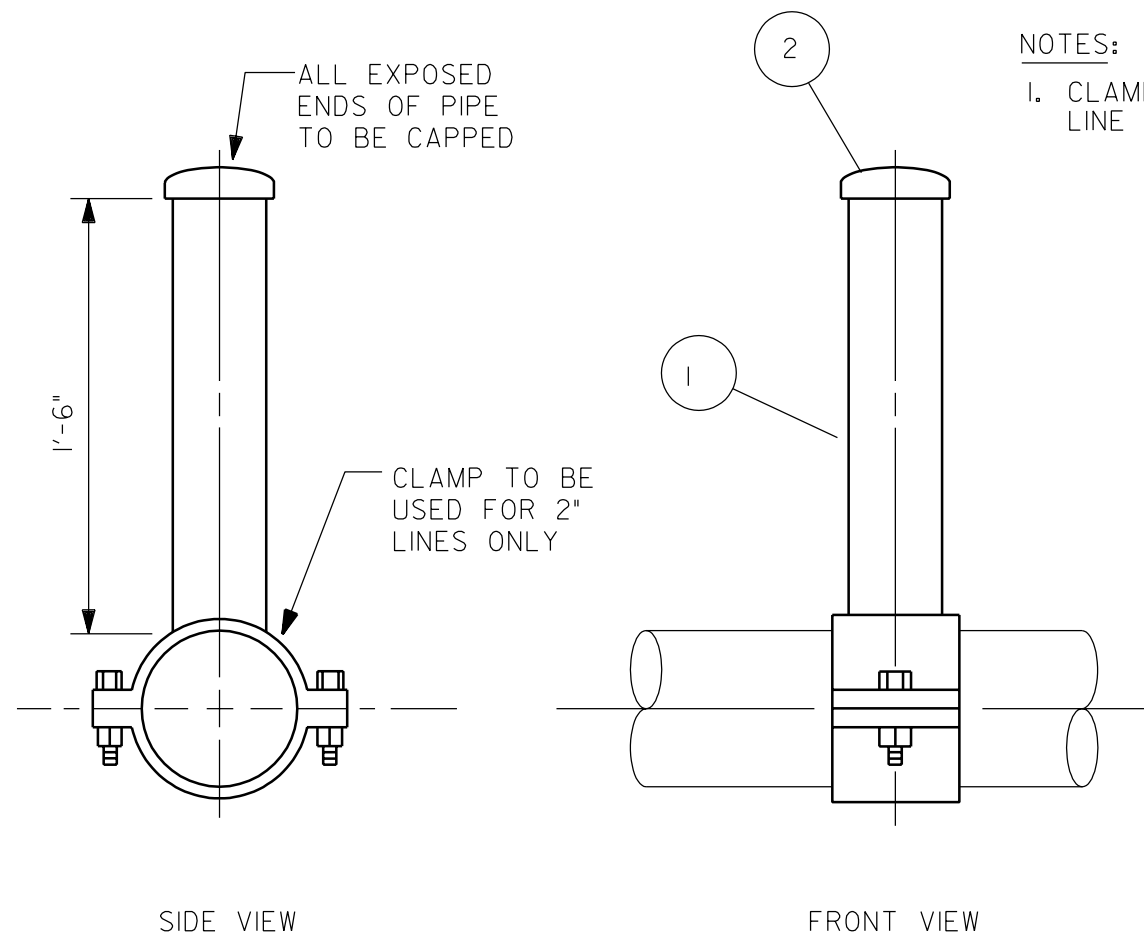
WATER DEPARTMENT

City of San Diego



INSTRUMENT SUPPORT  
SINGLE COLUMN MOUNTING

STANDARD DETAIL
CIP
I-620



NOTES:

1. CLAMP TO BE USED FOR LINE SIZES OF 2".

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x18"	1	GALV STL PIPE
2	2"	2	PIPE CAP
3	2"	1	CLAMP, 2" PIPE
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

INSTRUMENT SUPPORT

2" LINE MOUNT ABOVE-CLAMP

1-621  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego

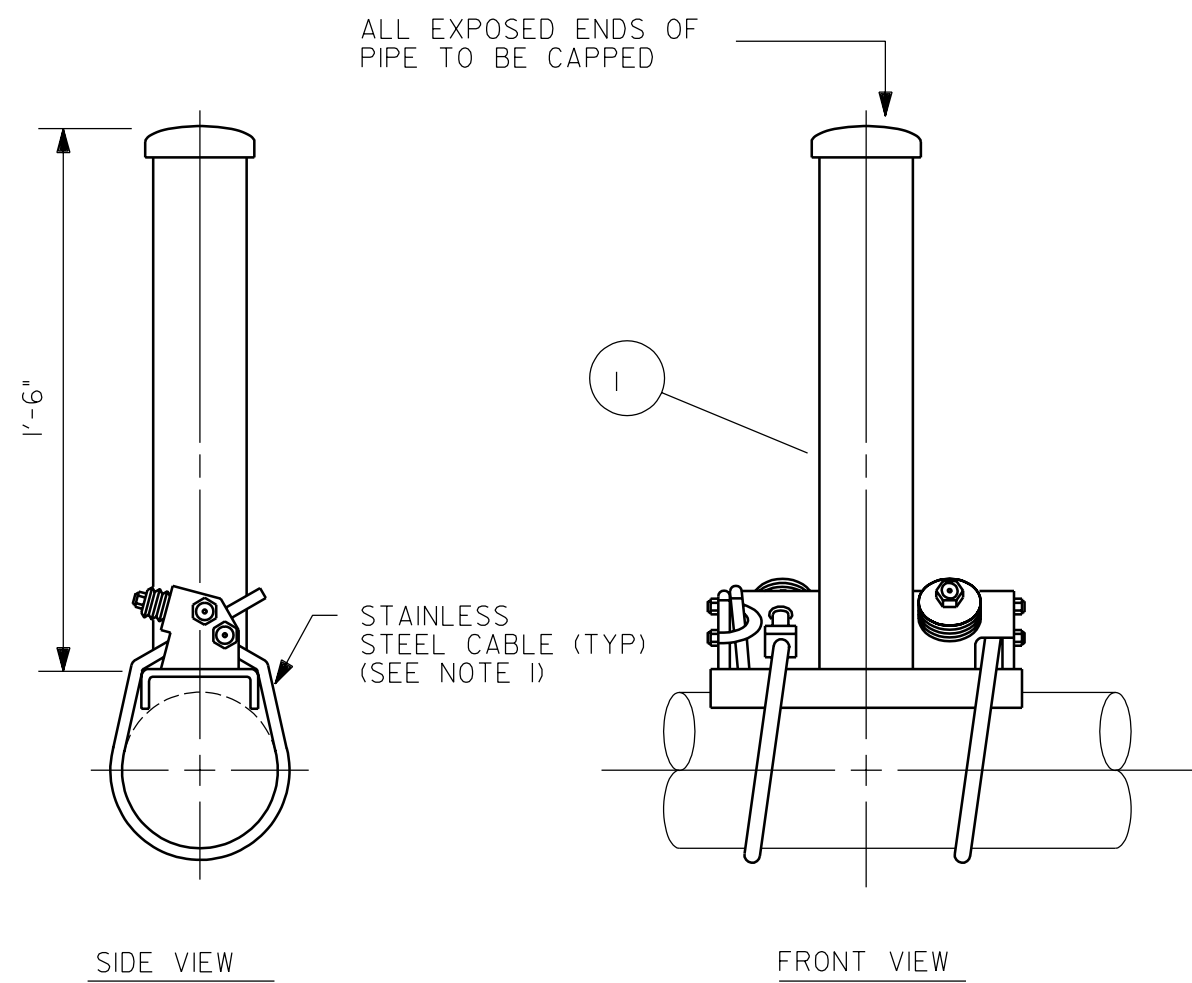


INSTRUMENT SUPPORT  
2" LINE MOUNT ABOVE-CLAMP

STANDARD  
DETAIL

CIP

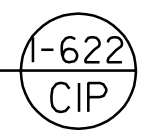
1-621




NOTES:  
1. CABLE CLAMP TO BE USED FOR  
LINE SIZES 3" THROUGH 14"

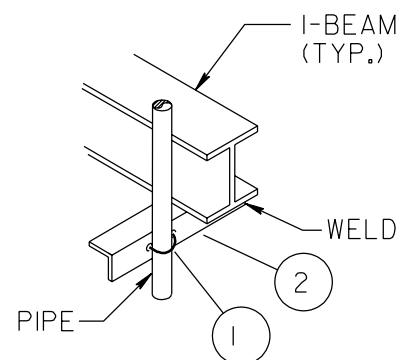
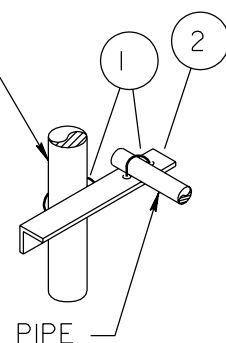
LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	2"x18"	1	GALV STL PIPE
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

INSTRUMENT SUPPORT  
3"-14" LINE MOUNT

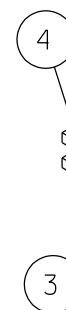


REVISION	BY	APPROVED	DATE	WATER DEPARTMENT City of San Diego		STANDARD DETAIL
REVIEWED BY		INITIALS	DATE	INSTRUMENT SUPPORT 3"-14" LINE MOUNT		CIP
						1-622

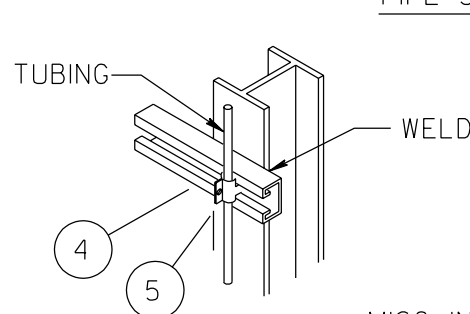
INSULATION PIPE  
FREE OF VIBRATION



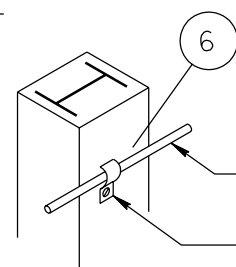
MISC. INSTRUMENT  
PIPE SUPPORT



WELD  
(WHEN WELDING IS NOT  
ALLOWED, USE STRUT BEAM  
CLAMPS & CLIPS TO ATTACH  
TO STRUCTURAL MEMBER  
IN FIELD) TYP



MISC. INSTRUMENT  
TUBING SUPPORT



TUBING

CINCH ANCHOR  
TO CONCRETE  
COLUMNS  
& WALLS

LIST OF MATERIALS

ITEM NO	SIZE	QTY	DESCRIPTION
1	AS REQ'D	-	U-BOLT, STL
2	2"x2"	-	ANGLE, 1/4", STL
3	AS REQ'D	-	PIPE CLAMP, STRUT
4	AS REQ'D	-	STRUT
5	AS REQ'D	-	TUBE CLAMP, SPLIT
6	AS REQ'D	-	TUBE CLAMP, I HOLE
7			
8			
9			
10			
11			
12			
13			
14			
15			

NOTES:

- INSTRUMENT PIPING/TUBING SHALL BE SUPPORTED FROM PIPE, PIPE SUPPORTS, & OTHER TYPES OF PERMANENT STRUCTURES AS SHOWN ABOVE ROUTING OF INSTRUMENT PIPING/TUBING TO BE DETERMINED IN FIELD.
- MAXIMUM SPACING BETWEEN SUPPORTS IS TO BE 5'-0". PIPING/TUBING RUNS OF LESS THAN 5'-0" NEED NOT BE SUPPORTED.

TYPICAL PIPING/TUBING SUPPORT

I-623  
CIP

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT  
City of San Diego

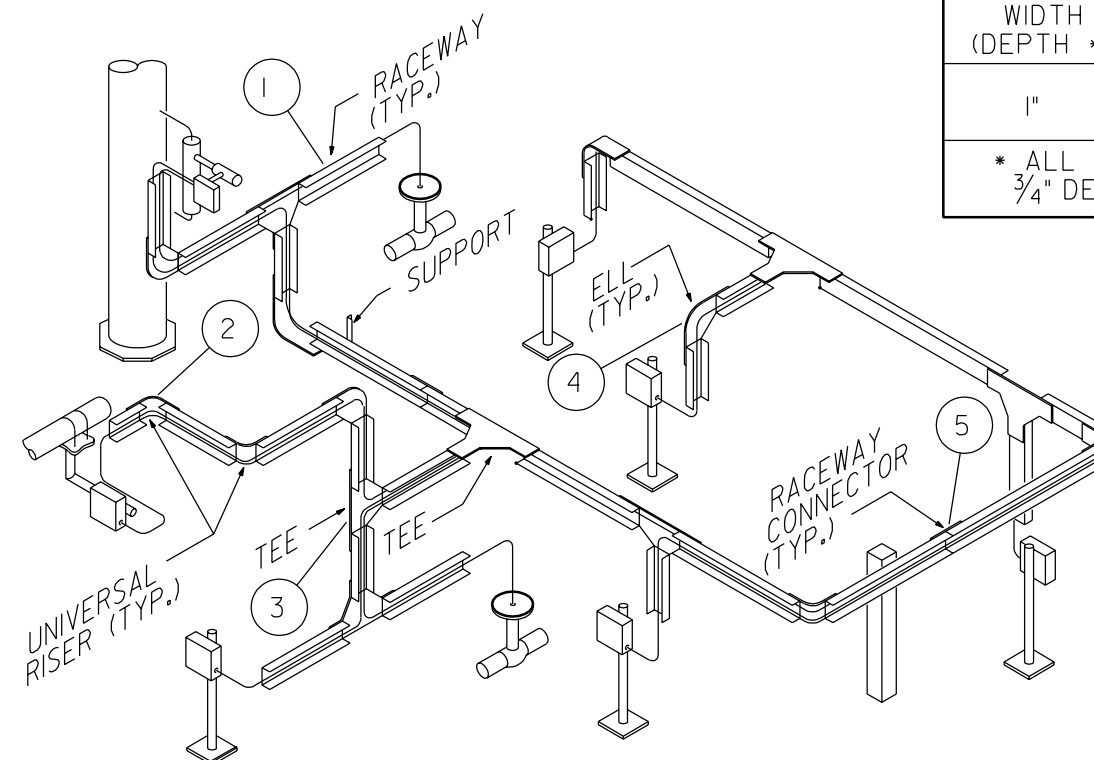


STANDARD  
DETAIL

CIP

TYPICAL PIPING/TUBING SUPPORT

I-623



MAX. NO. OF TUBES IN RACEWAY			
RACEWAY WIDTH (DEPTH *)	TUBING O.D. WITH 1/32 PLASTIC COATING		
1"	1/4"	3/8"	1/2"
	2	2	1
* ALL RACEWAY CHANNEL TO BE 3/4" DEEP			

LIST OF MATERIALS			
ITEM NO	SIZE	QTY	DESCRIPTION
1	AS REQ'D	-	TUBING RACEWAY
2	AS REQ'D	-	UNIVERSAL RISER
3	AS REQ'D	-	RACEWAY TEE
4	AS REQ'D	-	RACEWAY ELBOW
5	AS REQ'D	-	RACEWAY CONN.
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			


TYPICAL PNEUMATIC TUBING SUPPORT

I-624  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT

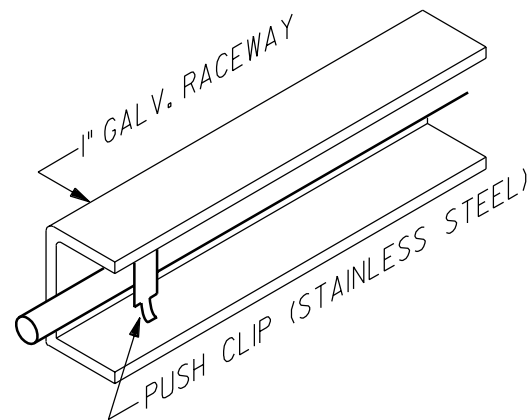
City of San Diego



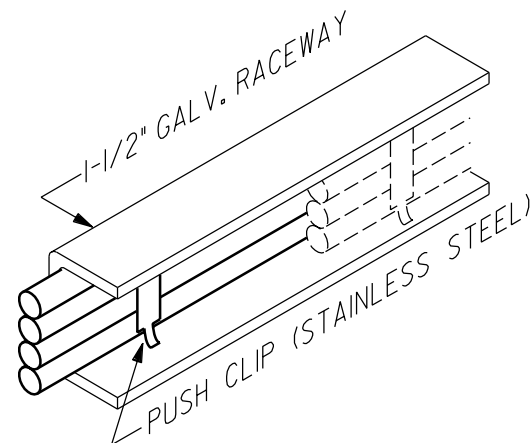
TYPICAL PNEUMATIC TUBING SUPPORT

STANDARD DETAIL
CIP
I-624





DETAIL "A"  
DETAIL FOR SUPPORT OF  
1 TO 3 TUBING LEADS.



DETAIL "B"  
DETAIL FOR SUPPORT OF 4 OR  
MORE TUBING LEADS WITH 1-1/2"  
& LARGER RACEWAY DOUBLE  
LAYER IS PERMITTED.

NOTES:

1. SUPPORT RACEWAY EVERY 6'-0".
2. SECURE TUBING IN RACEWAY EVERY 2'-0".
3. RACEWAY FITTINGS COME WITH DRIVE RIVETS AND ARE PRE-DRILLED. USE THEM FOR TEMPLATES ON RACEWAY.
4. SHORT RUNS OF TUBING 2'-0" IN LENGTH OR LESS DO NOT REQUIRE SUPPORT.

LIST OF MATERIALS

ITEM NO	SIZE	QTY	DESCRIPTION
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

TUBING SUPPORT  
RACEWAY DETAIL

1-625  
CIP

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT  
City of San Diego

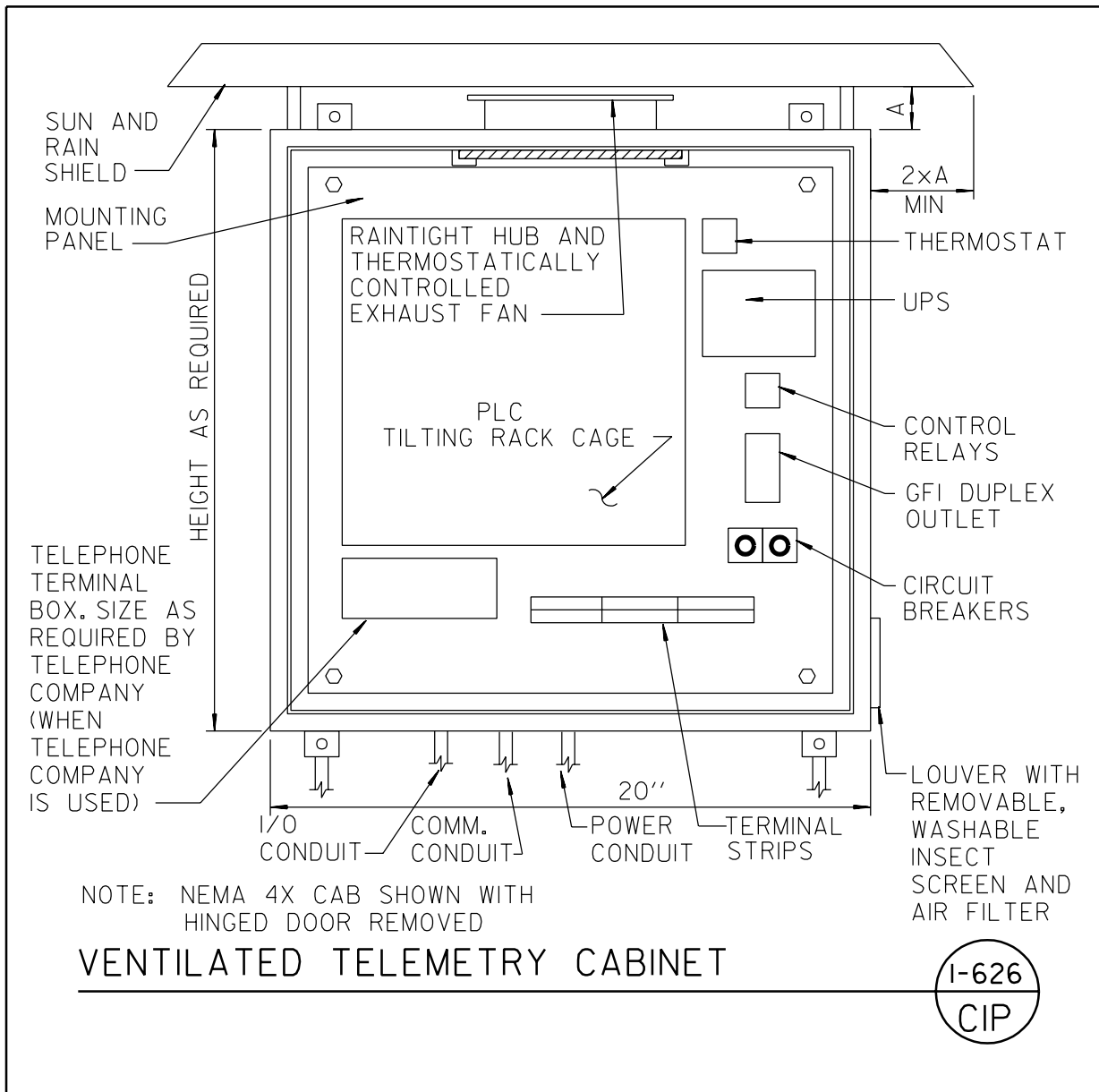


TUBING SUPPORT  
RACEWAY DETAIL

STANDARD  
DETAIL

CIP

1-625



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

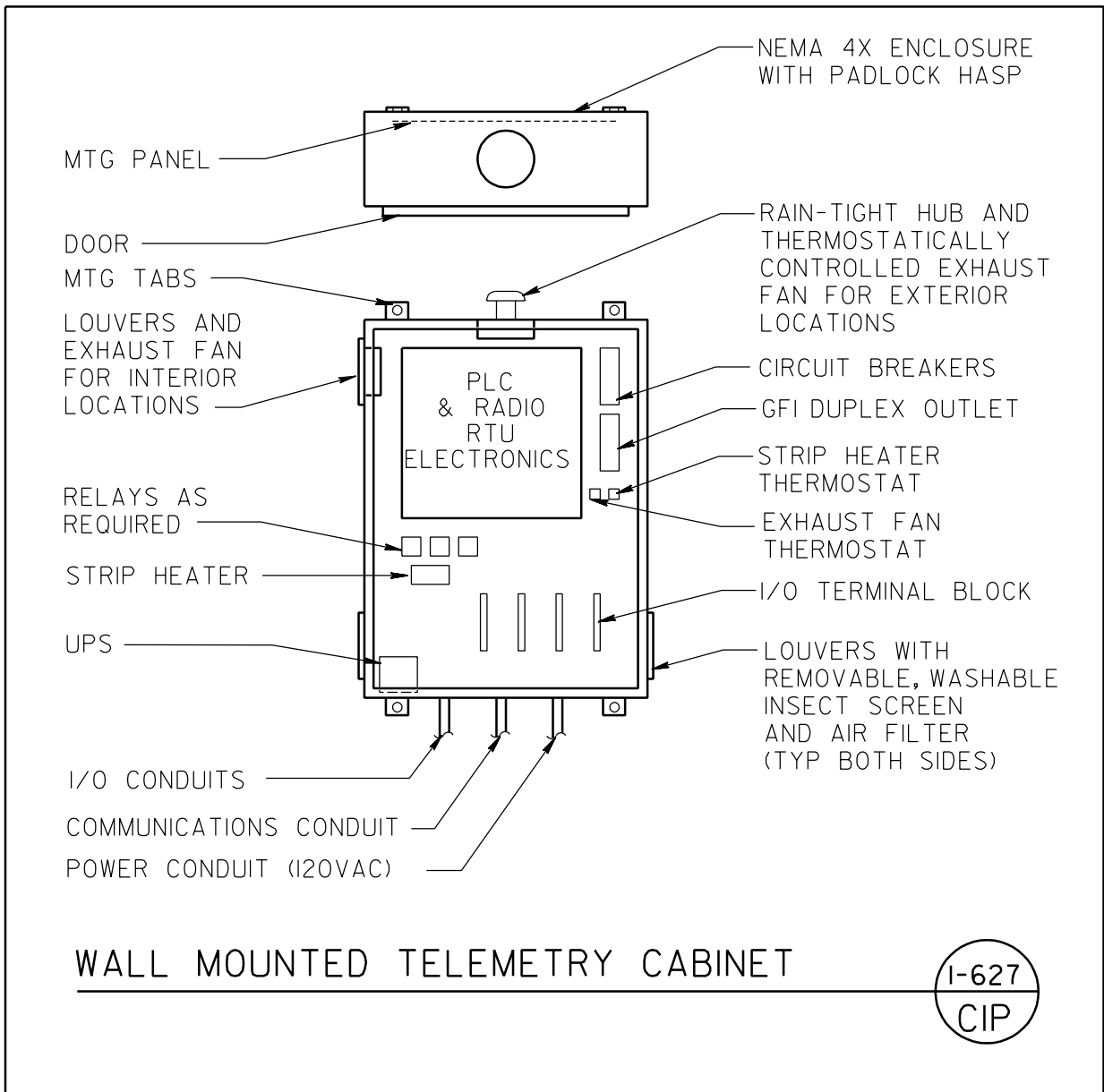


STANDARD  
DETAIL

CIP

**VENTILATED TELEMETRY CABINET**

I-626



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

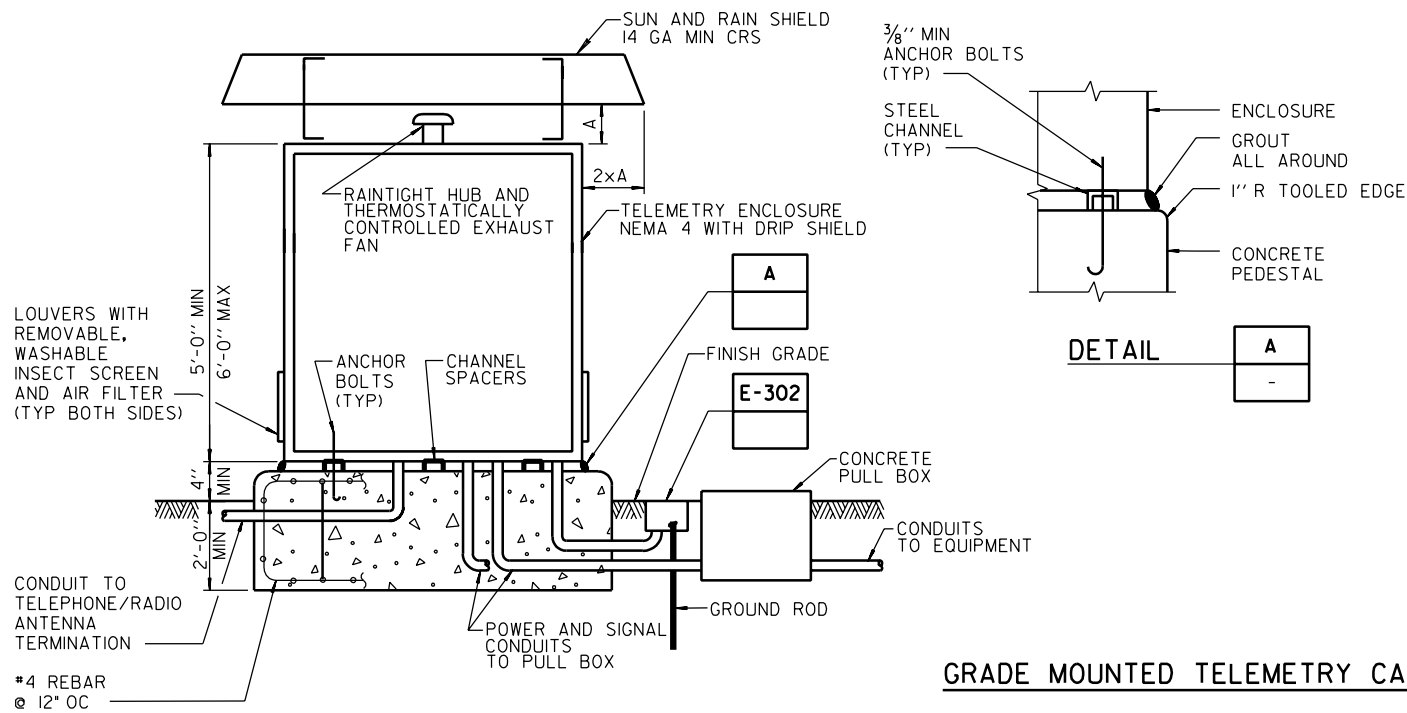


STANDARD  
DETAIL

CIP

**WALL MOUNTED TELEMETRY CABINET**

1-627



GRADE MOUNTED TELEMETRY CABINET

I-628  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego

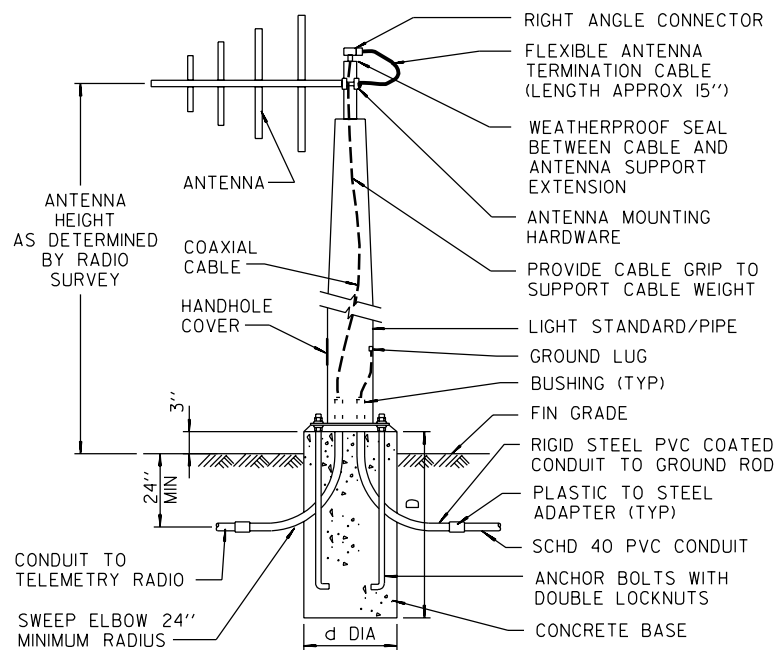


STANDARD  
DETAIL

CIP

GRADE MOUNTED TELEMETRY CABINET

I-628



POLE HGT	d	D
50'	30"	8'-0"
40'	28"	7'-0"
30'	24"	6'-0"
20'	20"	5'-6"
12'	20"	4'-6"

NOTE:

ALL ANTENNA CABLE CONNECTIONS  
TO BE WEATHERPROOFED

POLE MOUNTED DIRECTIONAL ANTENNA



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego

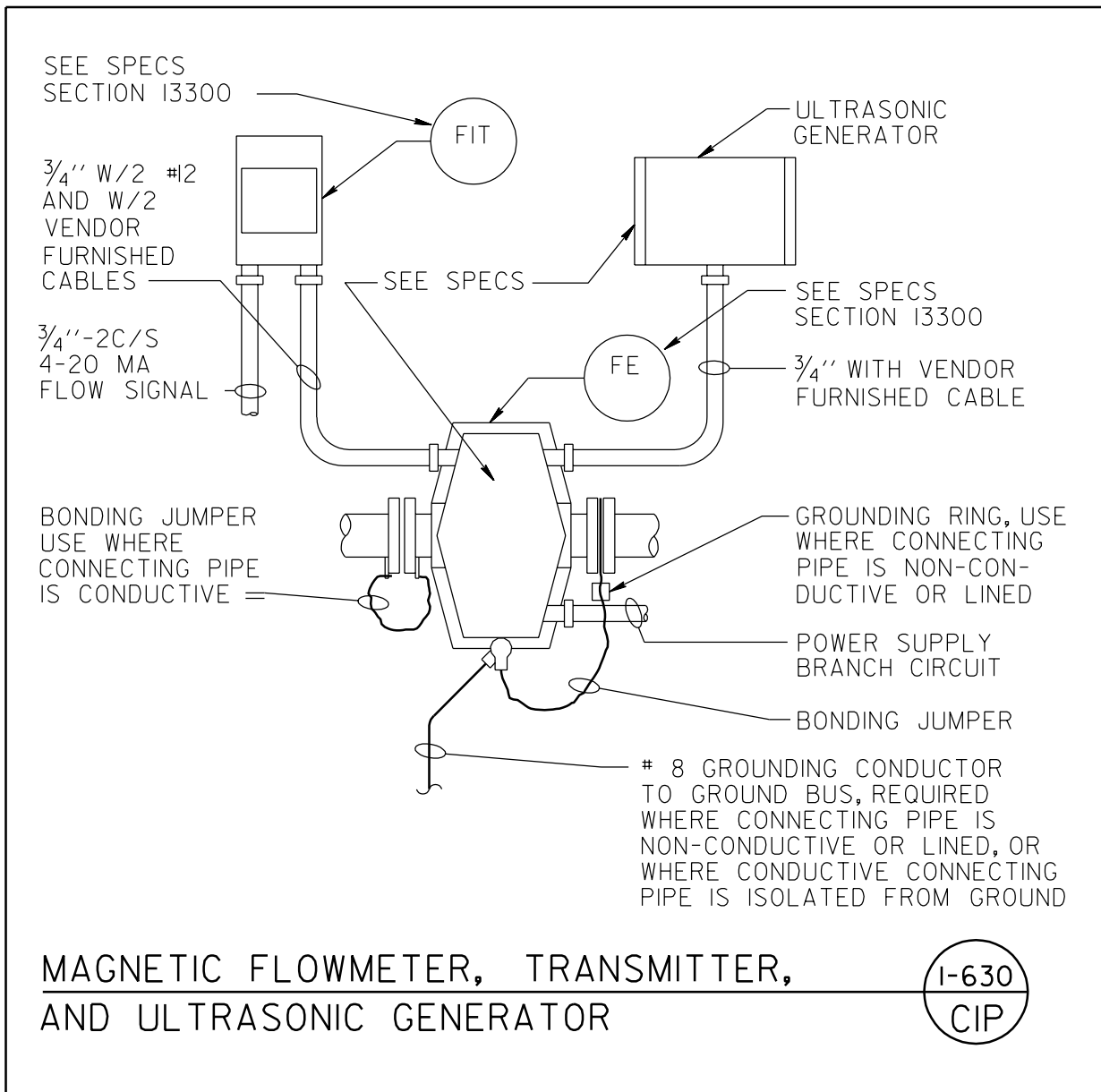


STANDARD  
DETAIL

CIP

POLE MOUNTED DIRECTIONAL ANTENNA


1-629



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

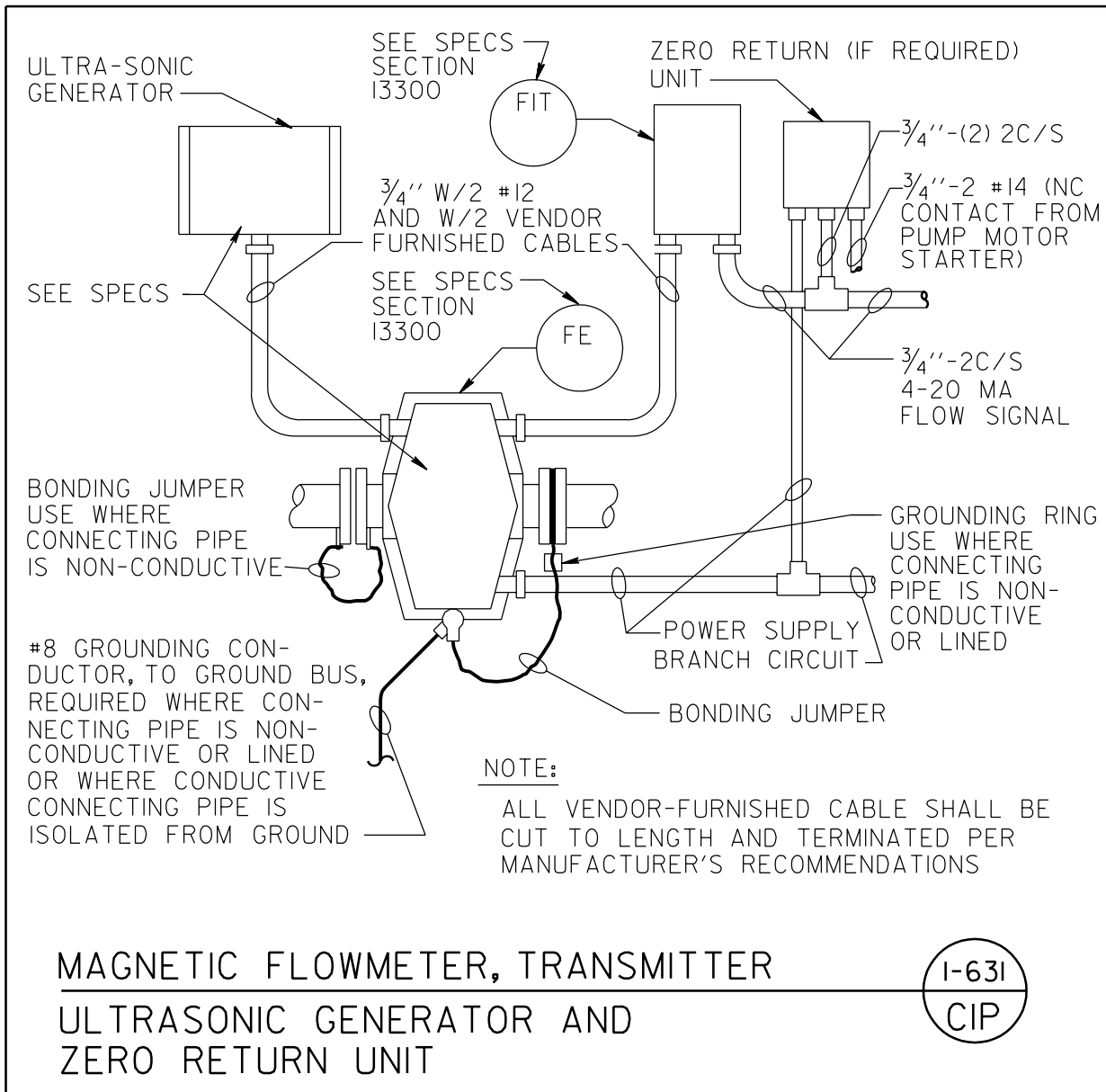
**WATER DEPARTMENT**

City of San Diego



**MAGNETIC FLOWMETER, TRANSMITTER, AND ULTRASONIC GENERATOR**

STANDARD DETAIL
CIP
I-630



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	


**WATER DEPARTMENT**

City of San Diego

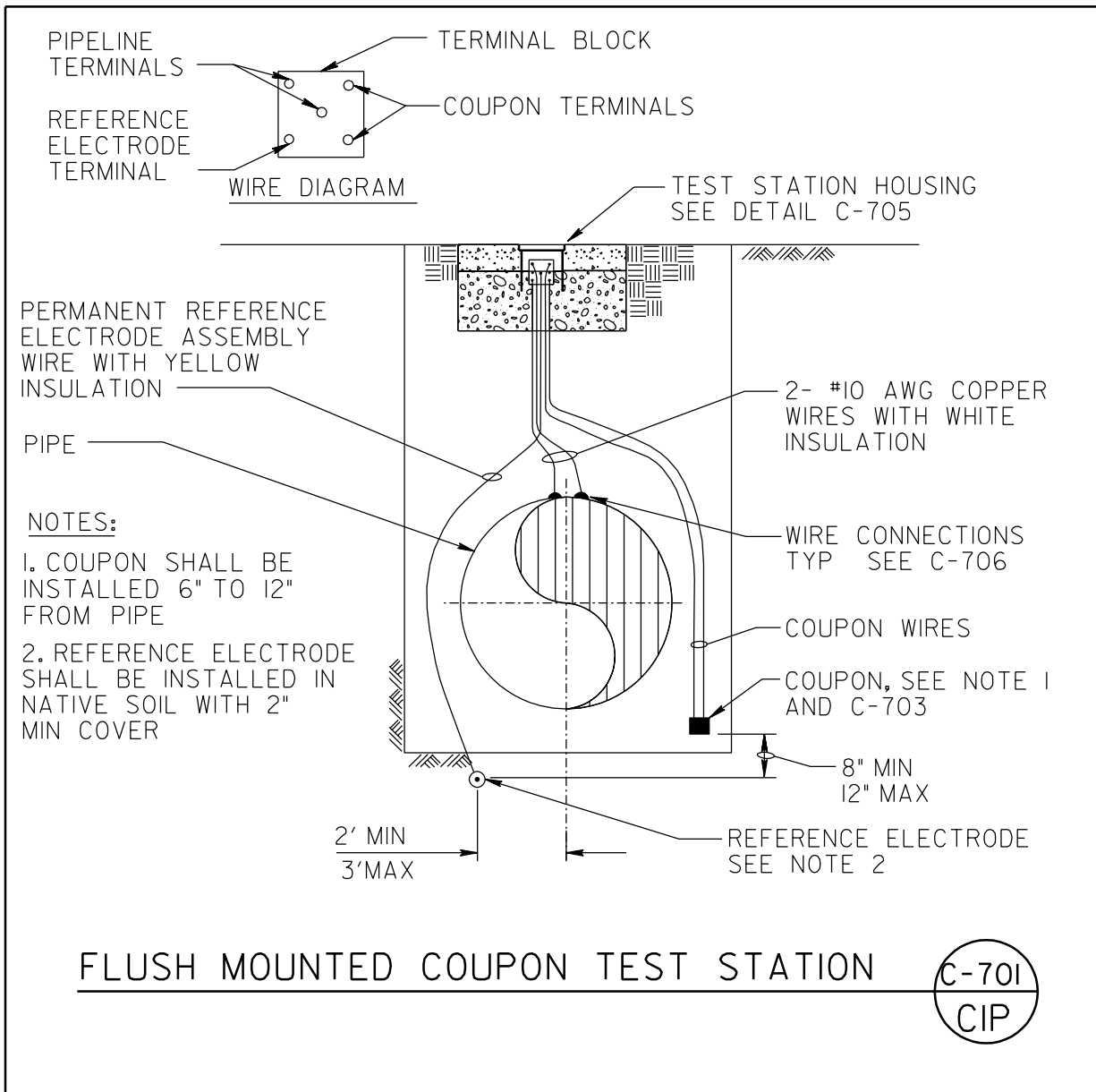
**MAGNETIC FLOWMETER, TRANSMITTER**

**ULTRASONIC GENERATOR AND**

**ZERO RETURN UNIT**



STANDARD DETAIL
CIP
1-631



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



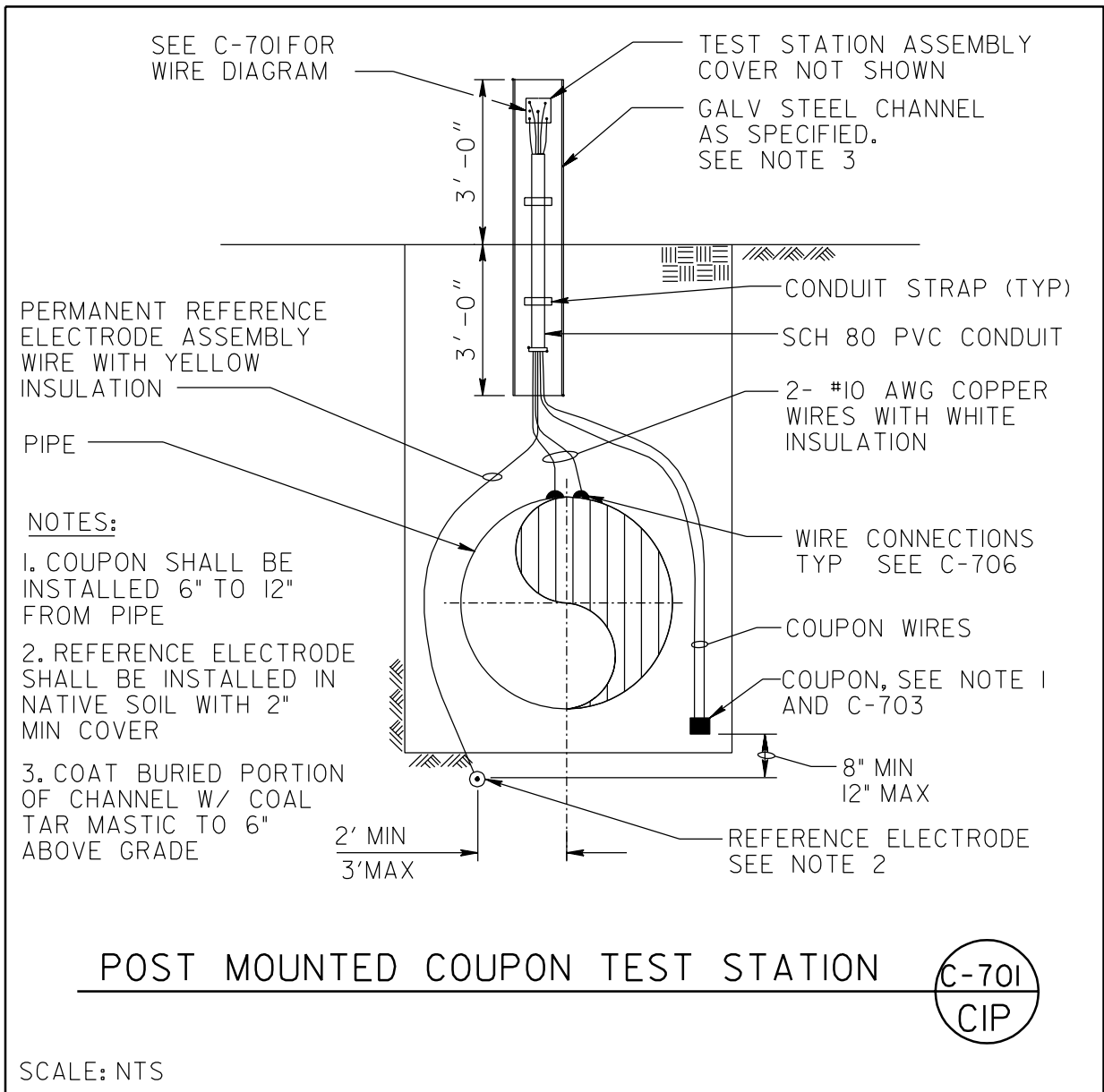
STANDARD  
DETAIL

CIP

**FLUSH MOUNTED COUPON  
TEST STATION**

**C-701**





REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

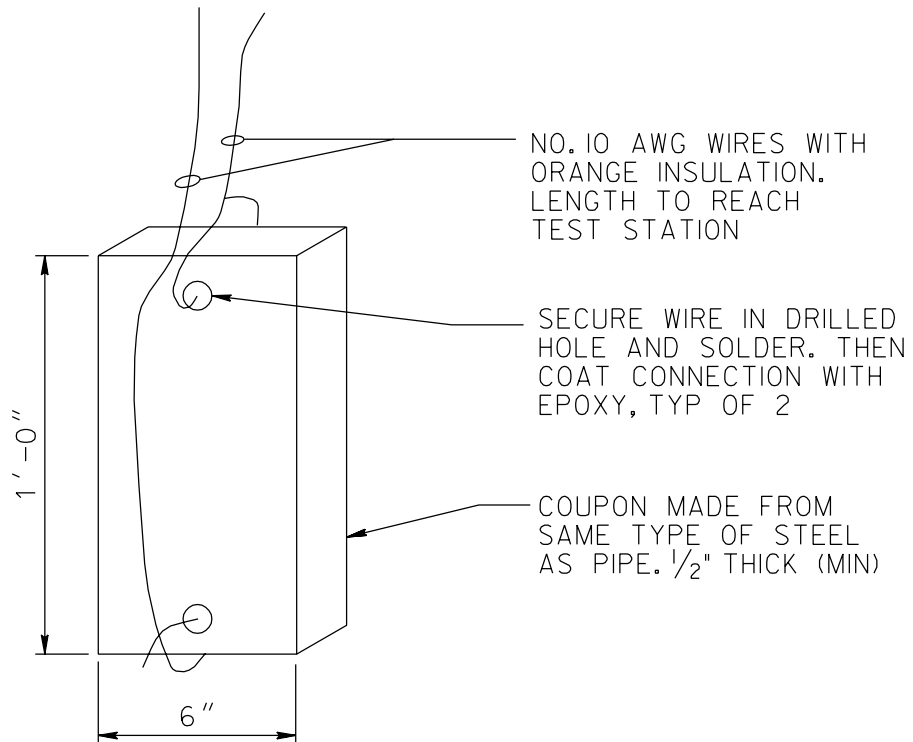


STANDARD  
DETAIL

CIP

**POST MOUNTED  
COUPON TEST STATION**

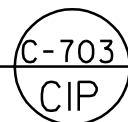
C-702



NOTES:

1. ABRASIVE BLAST COUPON AND COAT WITH RICH CEMENT MORTAR IN SHOP.
2. INSTALL COUPON IN ORIENTATION SHOWN.

COUPON DETAIL



SCALE: NO SCALE

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

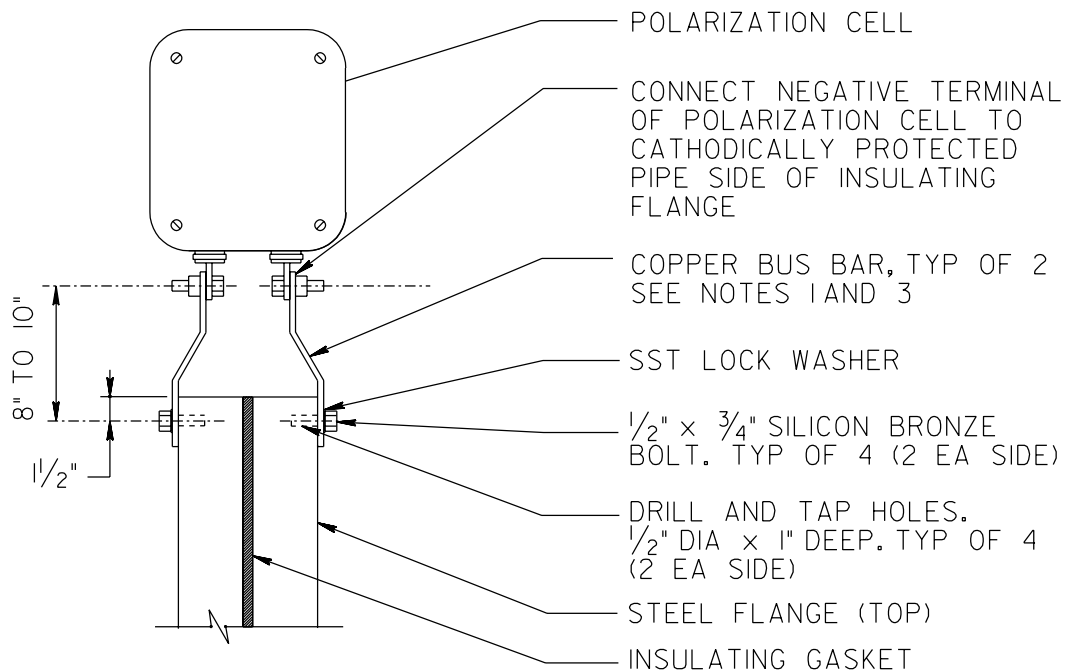


STANDARD  
DETAIL

CIP

COUPON DETAIL

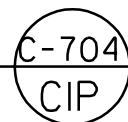
C-703




**NOTES:**

1. DRILL HOLES IN COPPER BUS BAR TO CONNECT DIRECTLY TO POLARIZATION CELL CONNECTORS. DRILL HOLES APPROX 1 1/2" OC AND 1" FROM BOTTOM OF BUS BAR FOR CONN TO FLANGE
2. COAT SURFACES OF COPPER BAR AS SPECIFIED
3. ATTACH BUS BARS PRIOR TO COATING FLANGE
4. NOT REQD FOR INSULATING FLEX COUPLINGS ON DI PIPE

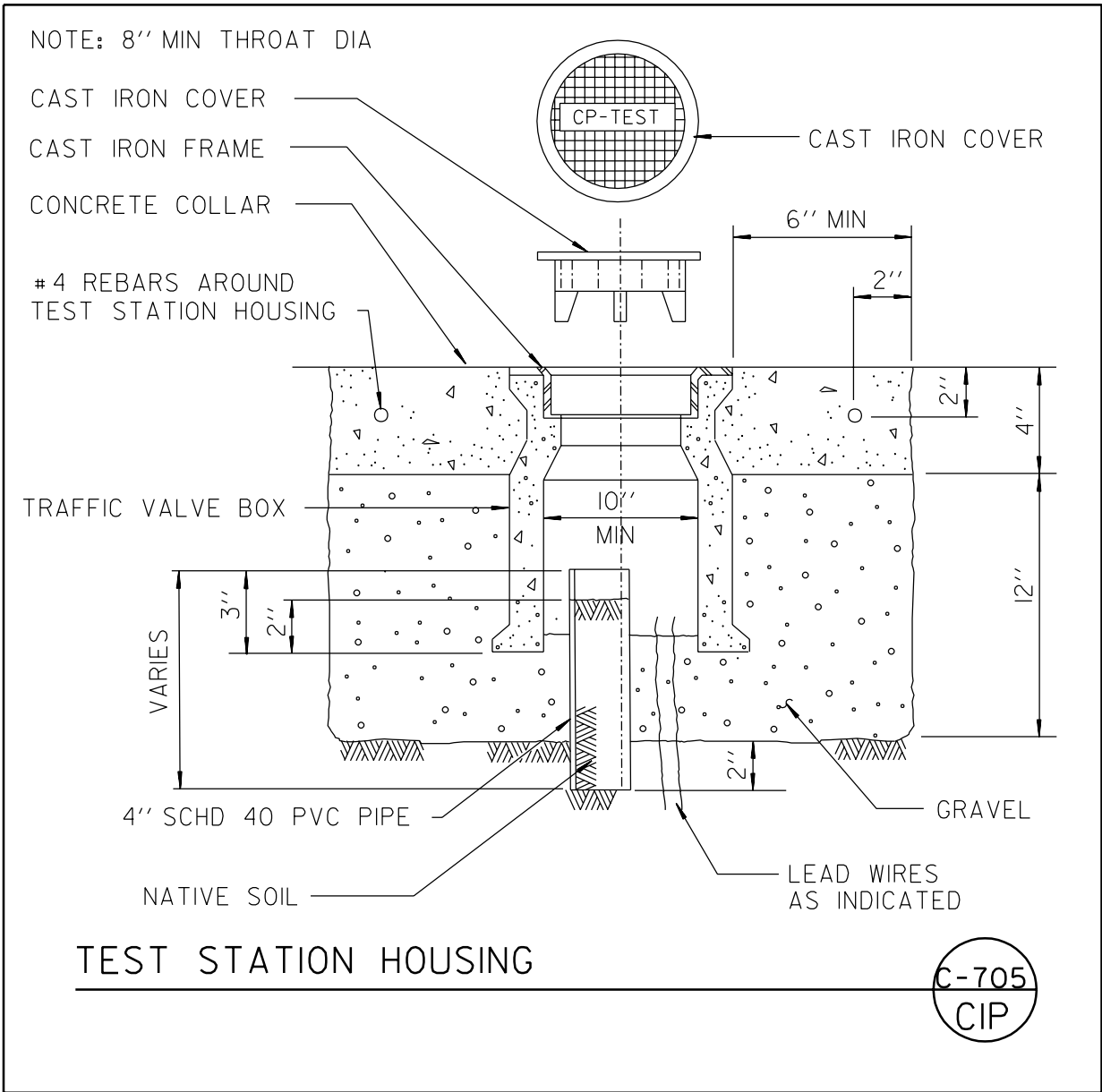
**POLARIZATION CELL**



REVISION	BY	APPROVED	DATE

<b>WATER DEPARTMENT</b> City of San Diego		
<b>POLARIZATION CELL</b>		C-704

STANDARD DETAIL
CIP
C-704



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

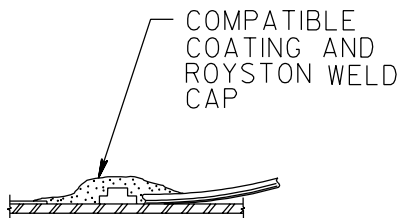
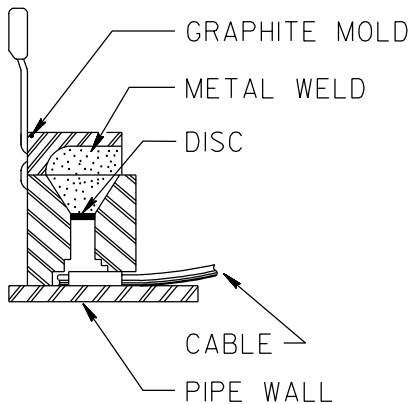
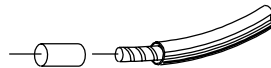
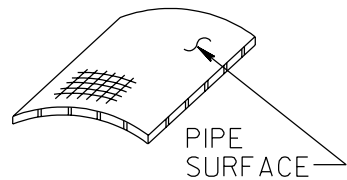


STANDARD  
DETAIL

CIP

TEST STATION HOUSING

C-705



1) FILE TO BARE METAL AND CLEAN SURFACE

2) STRIP INSULATION FROM WIRE AND ATTACH SLEEVE

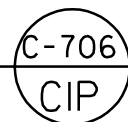
3) HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR. IGNITE WITH FLINT GUN

4) REMOVE SLAG FROM CONNECTION WITH CHIP HAMMER

5) COVER CONNECTION WITH COMPATIBLE COATING OVER ALL EXPOSED METAL

NOTE: CERAMIC MOLDS WILL NOT BE ALLOWED

## EXOTHERMIC WELD



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

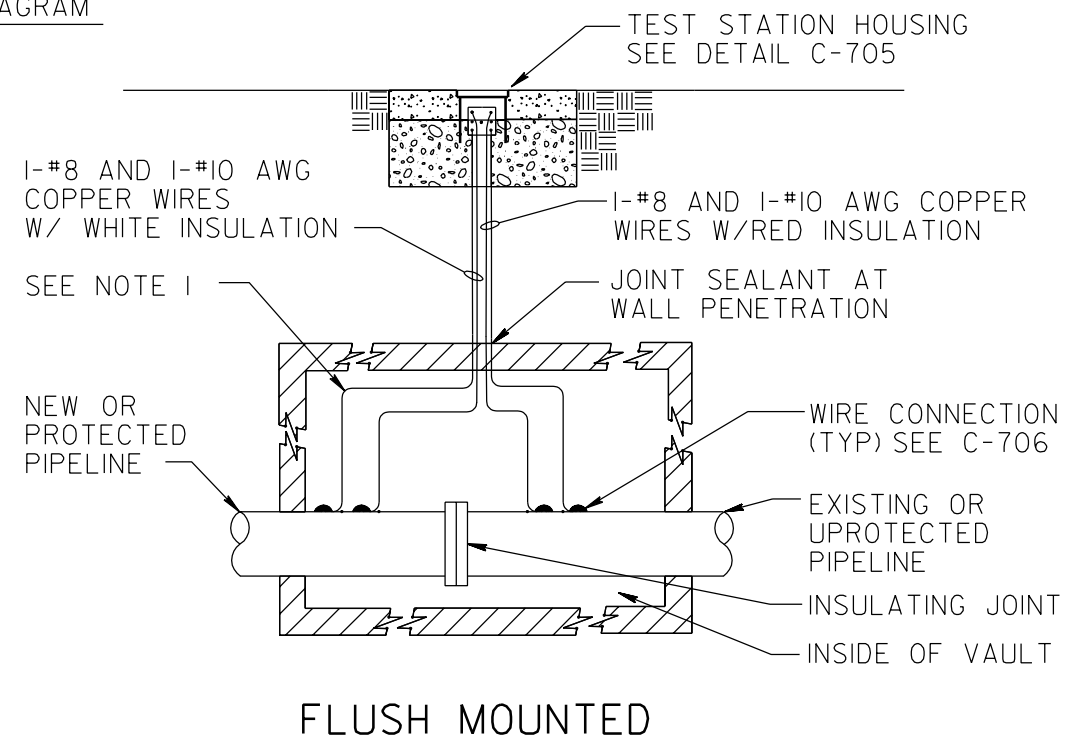
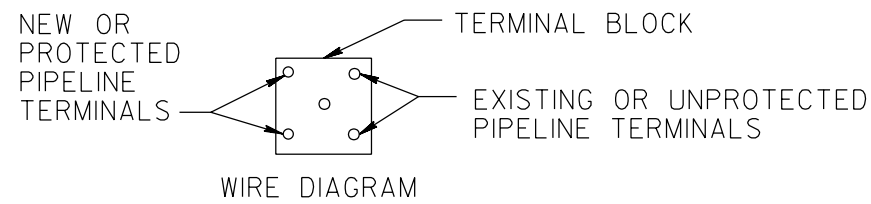
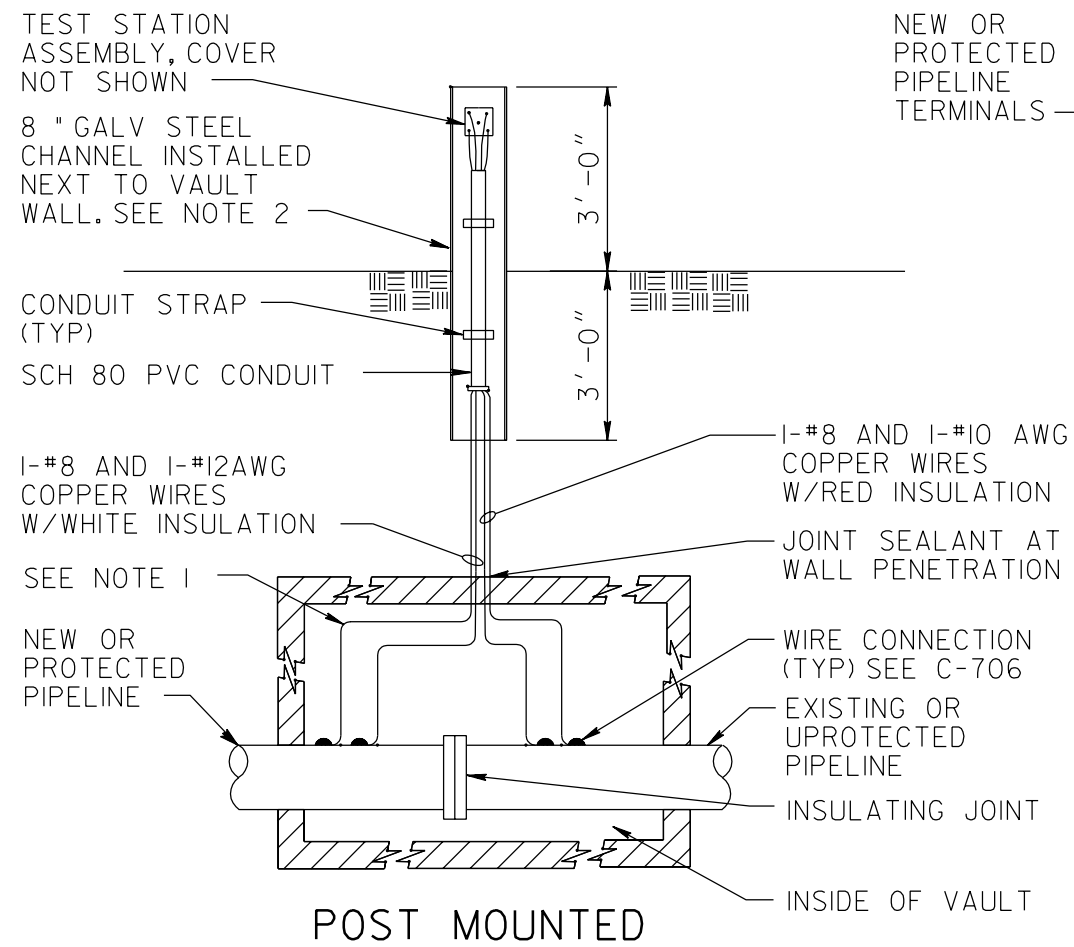


STANDARD  
DETAIL

CIP

EXOTHERMIC WELD

C-706

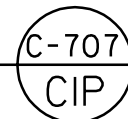


**NOTES:**

1. CONDUIT IN VAULTS NOT SHOWN FOR CLARITY. WIRES TO BE INSTALLED IN GALVANIZED STEEL CONDUIT FROM VAULT PENETRATION TO CONNECTION ON PIPELINE. ANCHOR CONDUIT ON VAULT WALLS AS SPECIFIED.
2. COAT BURIED PORTIONS OF STEEL BEAM W/COAL TAR MASTIC TO 6" ABOVE GRADE

SCALE: NTS

**TEST STATIONS FOR  
INSULATING JOINT INSIDE VAULT**



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

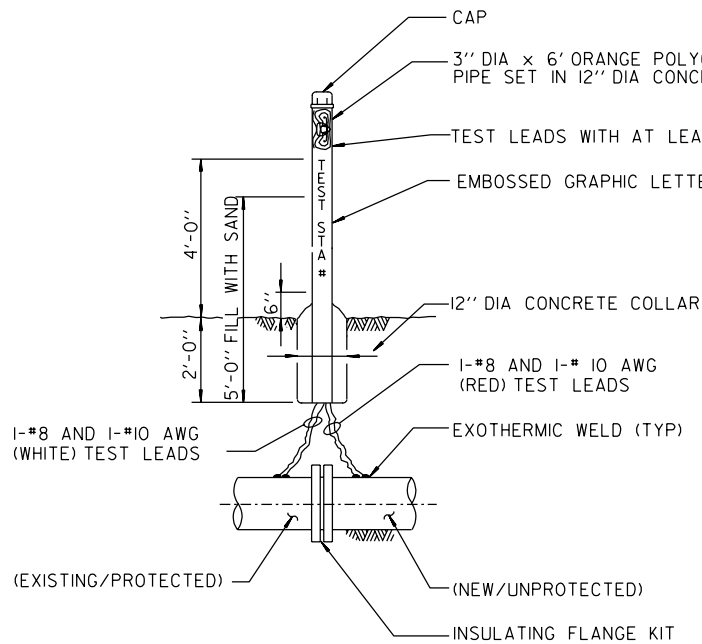


**TEST STATIONS FOR  
INSULATING JOINT INSIDE VAULT**

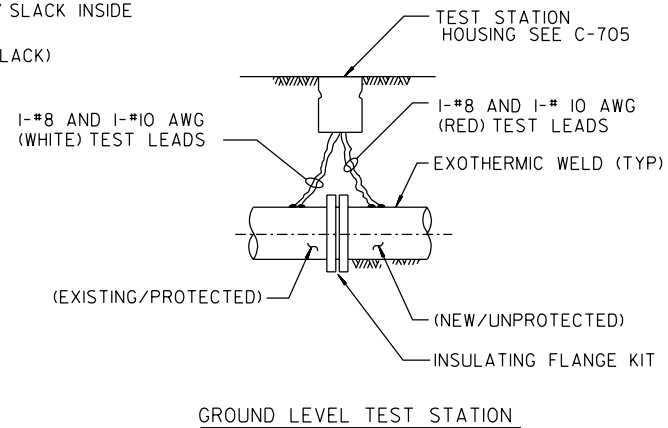
STANDARD  
DETAIL

CIP

C-707



POST MOUNTED TEST STATION  
(ALTERNATE POST CONFIGURATION)



TEST STATION FOR INSULATING JOINT  
DIRECT BURIAL



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**WATER DEPARTMENT**  
City of San Diego

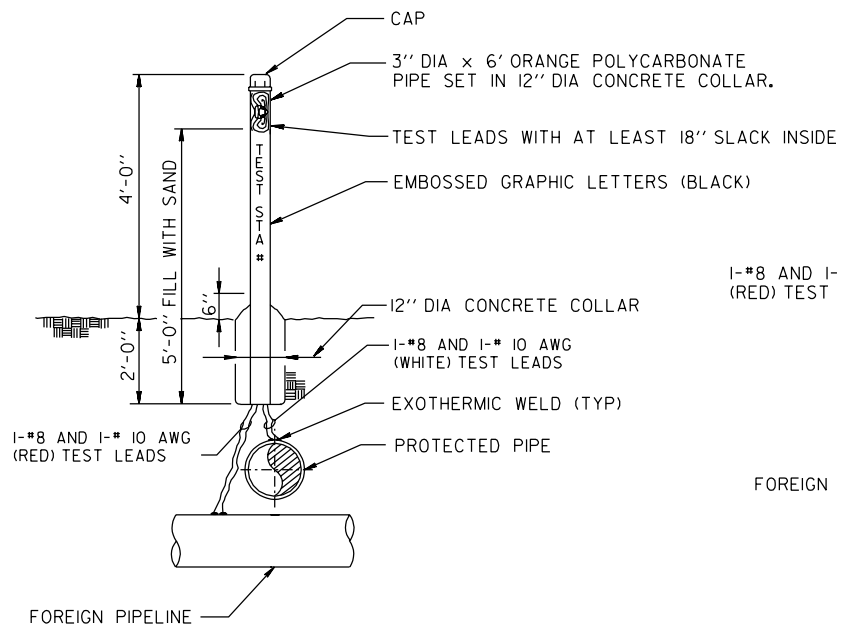


**TEST STATION FOR INSULATING  
JOINT, DIRECT BURIAL**

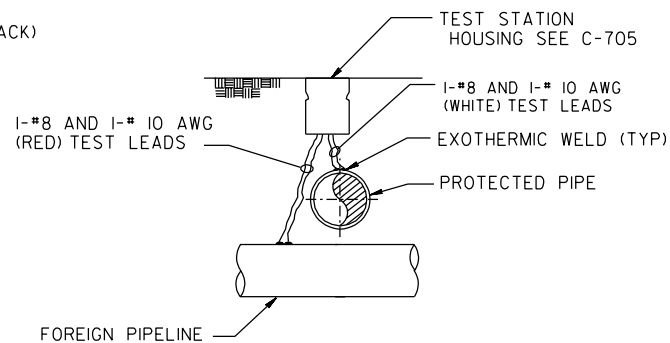
STANDARD  
DETAIL

CIP

C-708



POST MOUNTED TEST STATION  
(ALTERNATE POST CONFIGURATION)



GROUND LEVEL TEST STATION

# TEST STATION FOR FOREIGN PIPELINE CROSSING



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego



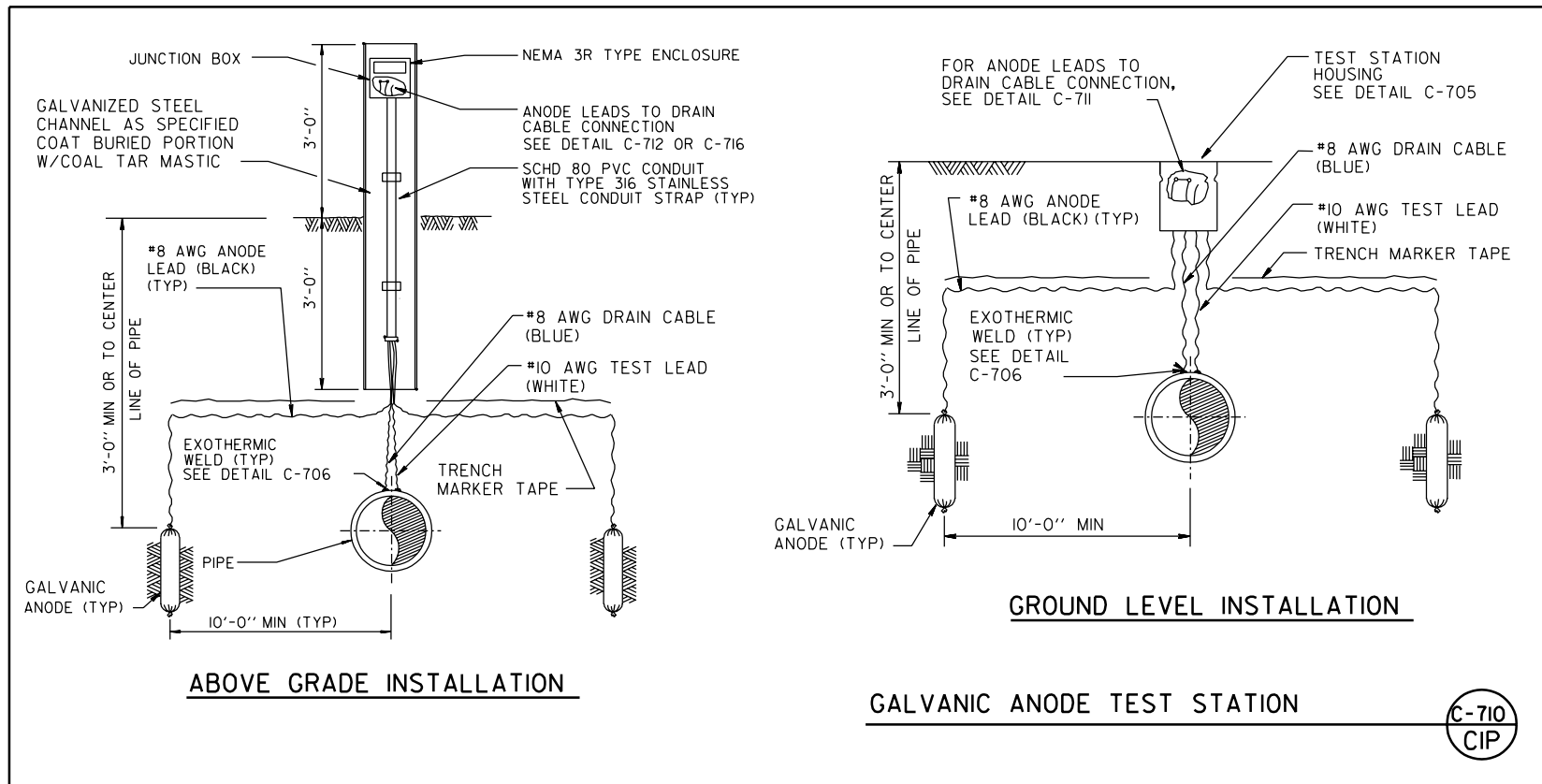
STANDARD  
DETAIL

**TEST STATION FOR FOREIGN  
PIPELINE CROSSING**



**CIP**

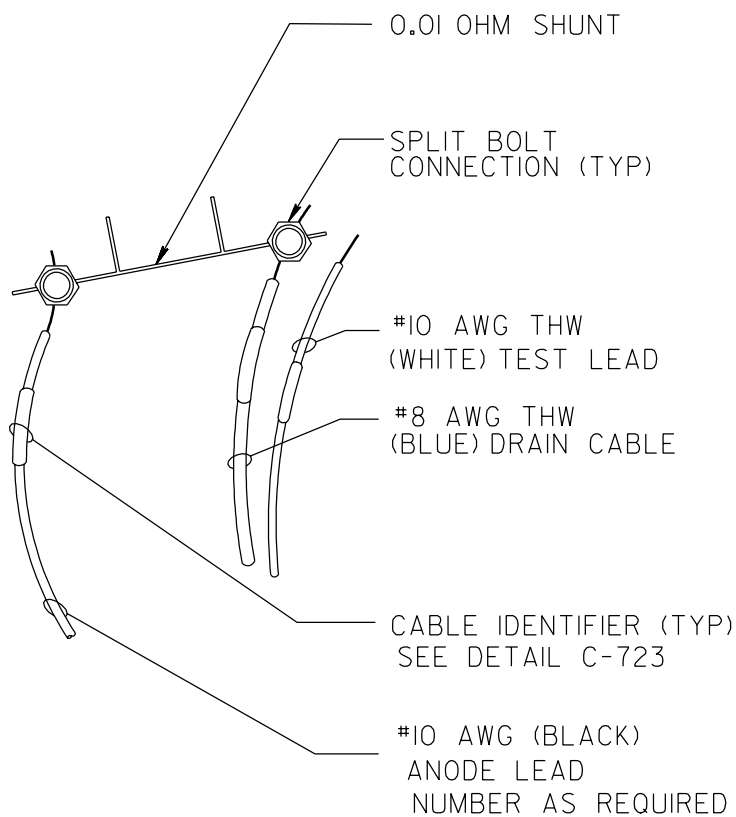
**C-709**



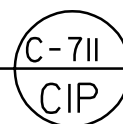


REVISION	BY	APPROVED	DATE

<b>WATER DEPARTMENT</b> City of San Diego			STANDARD DETAIL
			CIP
<b>GALVANIC ANODE TEST STATION</b>			C-710
			CIP



GALVANIC ANODE LEAD TO DRAIN CABLE  
CONNECTION



REVISION	BY	APPROVED	DATE

**WATER DEPARTMENT**  
City of San Diego

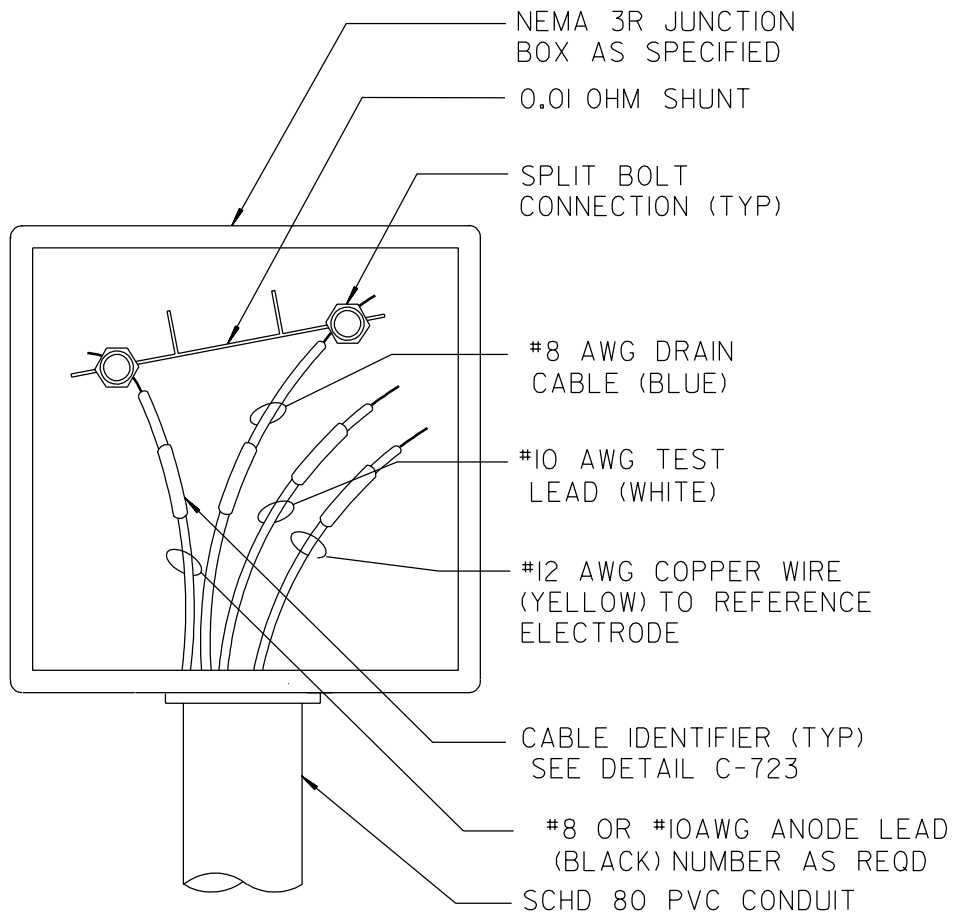


STANDARD  
DETAIL

CIP

GALVANIC ANODE LEAD TO DRAIN  
CABLE CONNECTION

C-711



# ABOVE GRADE GALVANIC ANODE JUNCTION BOX

C-712  
CIP

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

**WATER DEPARTMENT**  
City of San Diego

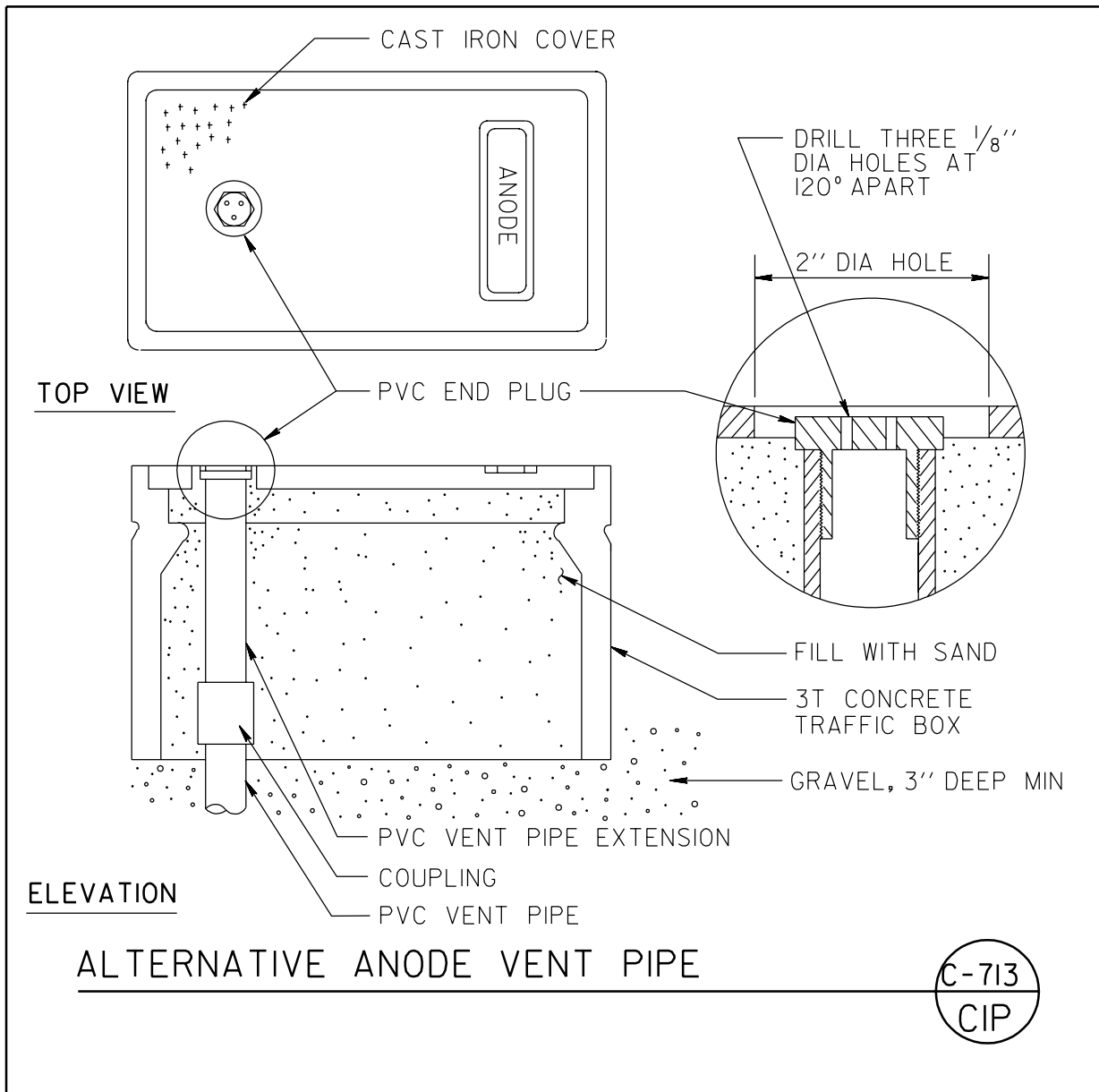


STANDARD  
DETAIL

CIP

ABOVE GRADE GALVANIC ANODE  
JUNCTION BOX

C-712



NOTE:

FOR USE IN PEDESTRIAN TRAFFIC AREAS

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**WATER DEPARTMENT**  
City of San Diego

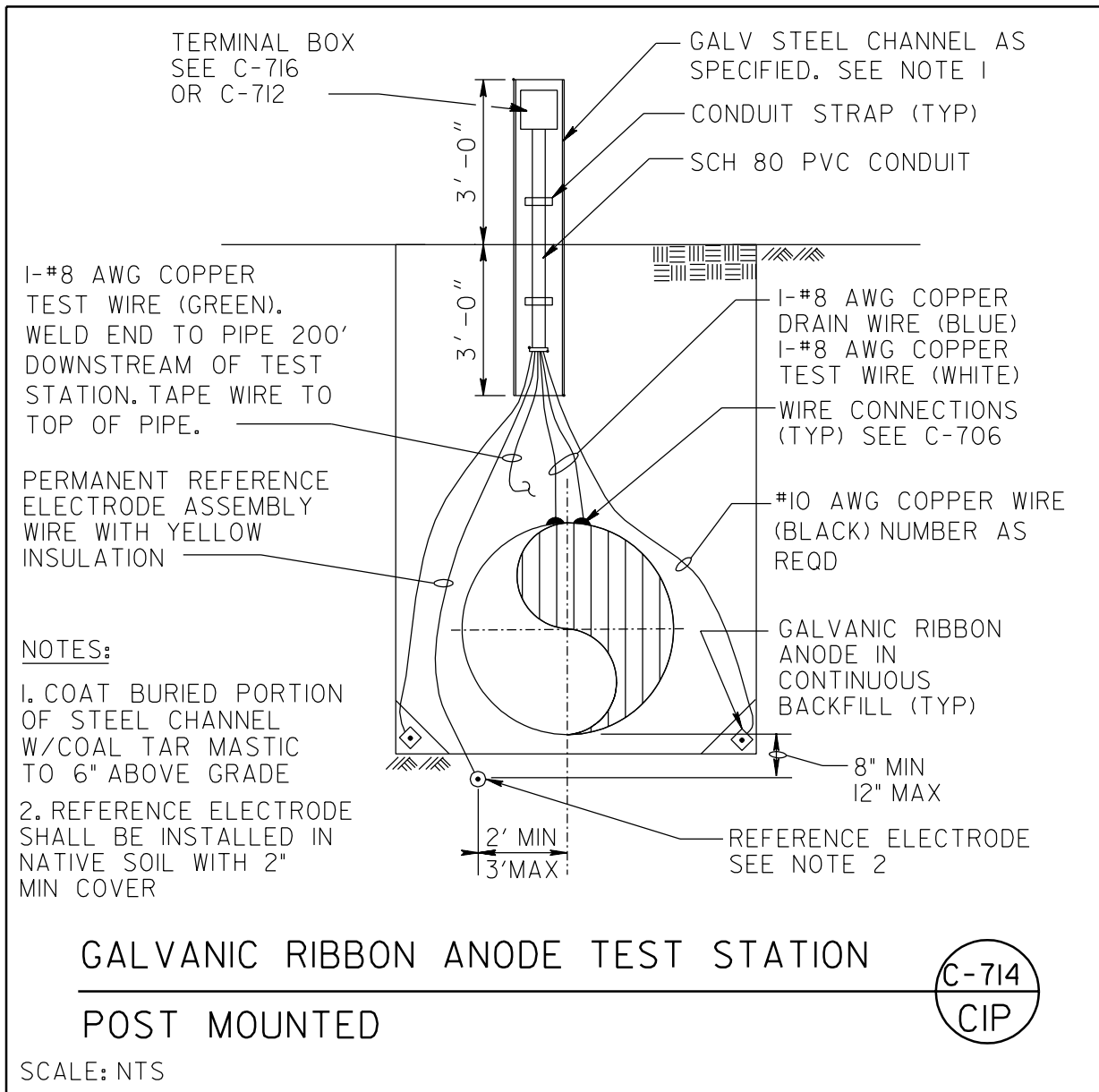


STANDARD  
DETAIL

CIP

**ALTERNATIVE ANODE VENT PIPE**

C-713



REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego

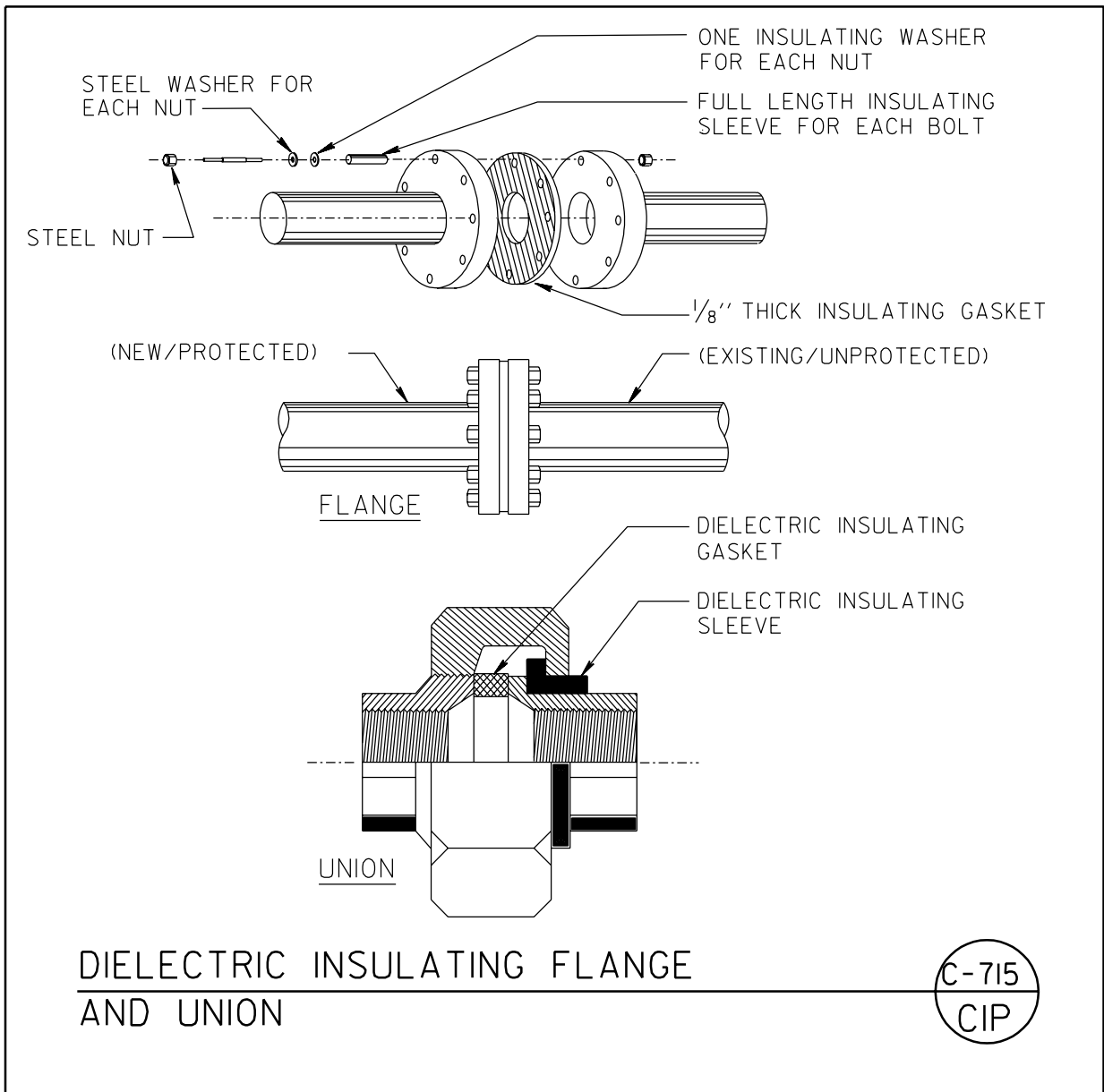


STANDARD  
DETAIL

CIP

**GALVANIC RIBBON ANODE  
TEST STATION POST MOUNTED**

C-714



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

**WATER DEPARTMENT**  
City of San Diego

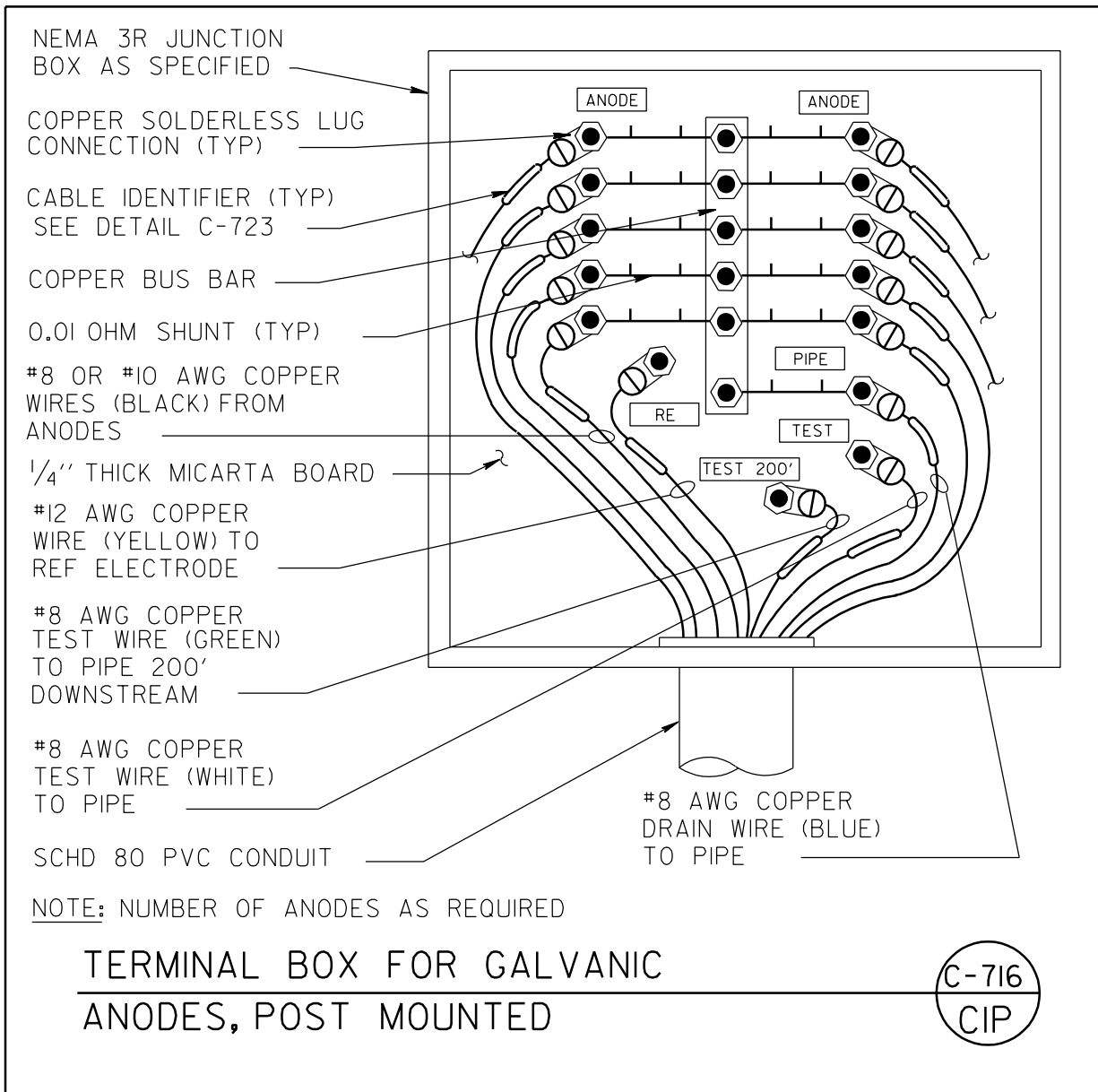


**DIELECTRIC INSULATING FLANGE AND UNION**

STANDARD  
DETAIL

CIP

C-715



REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego

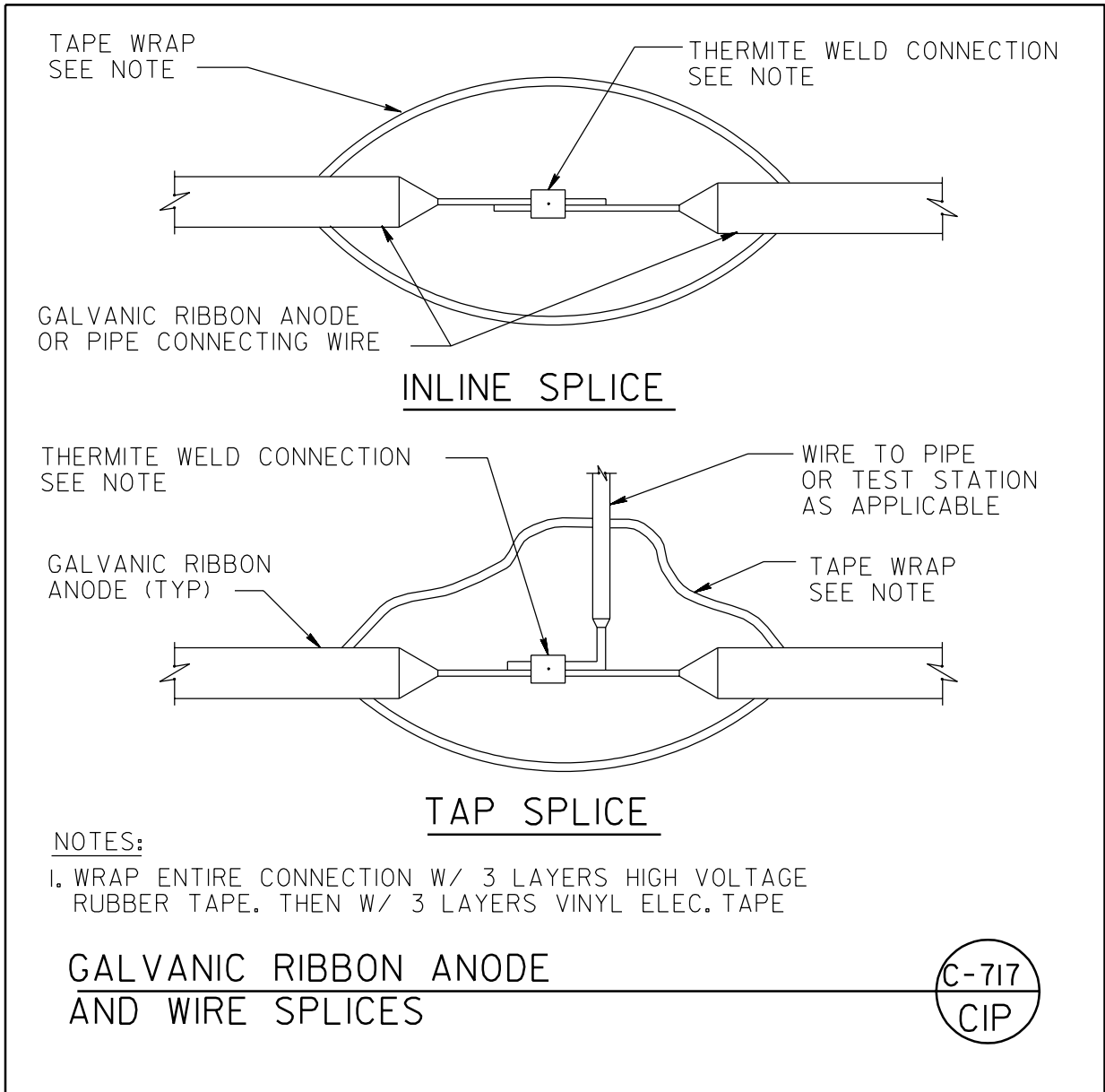


STANDARD  
DETAIL

CIP

**TERMINAL BOX FOR GALVANIC  
ANODES, POST MOUNTED**

C-716



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

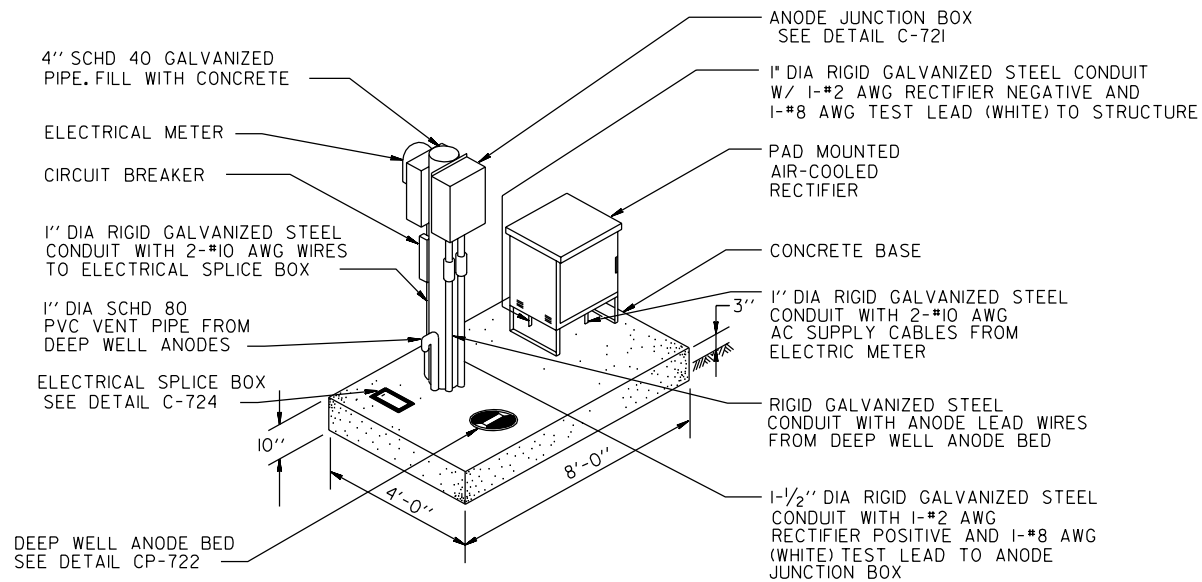
**WATER DEPARTMENT**  
City of San Diego



**GALVANIC RIBBON ANODE  
AND WIRE SPLICES**

STANDARD DETAIL
CIP
C-717





RECTIFIER AND ANODE JUNCTION BOX  
INSTALLATION DETAIL



REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

**WATER DEPARTMENT**  
City of San Diego

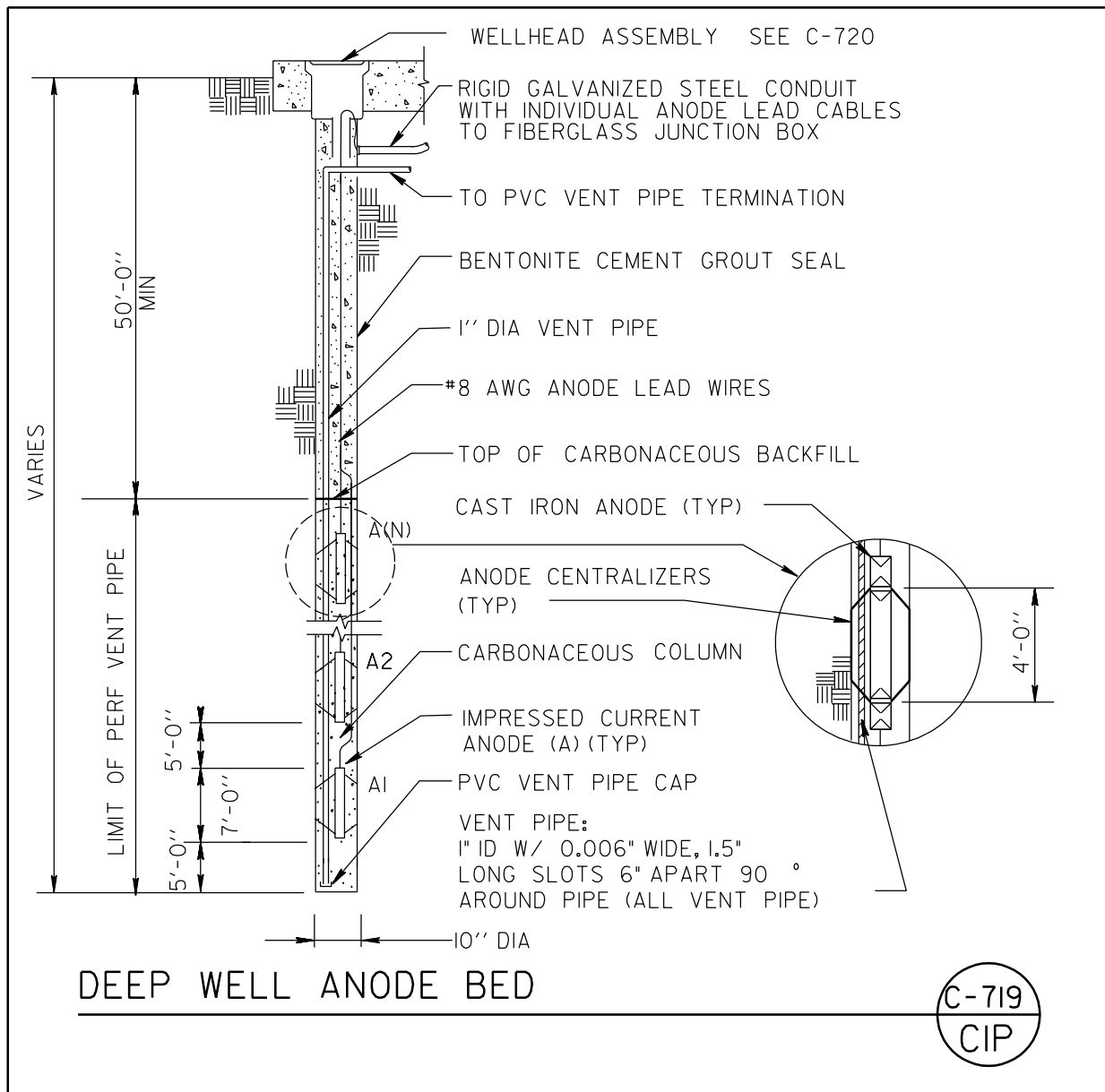


STANDARD  
DETAIL

**RECTIFIER AND ANODE JUNCTION  
BOX INSTALLATION DETAIL**

CIP

C-718



REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego

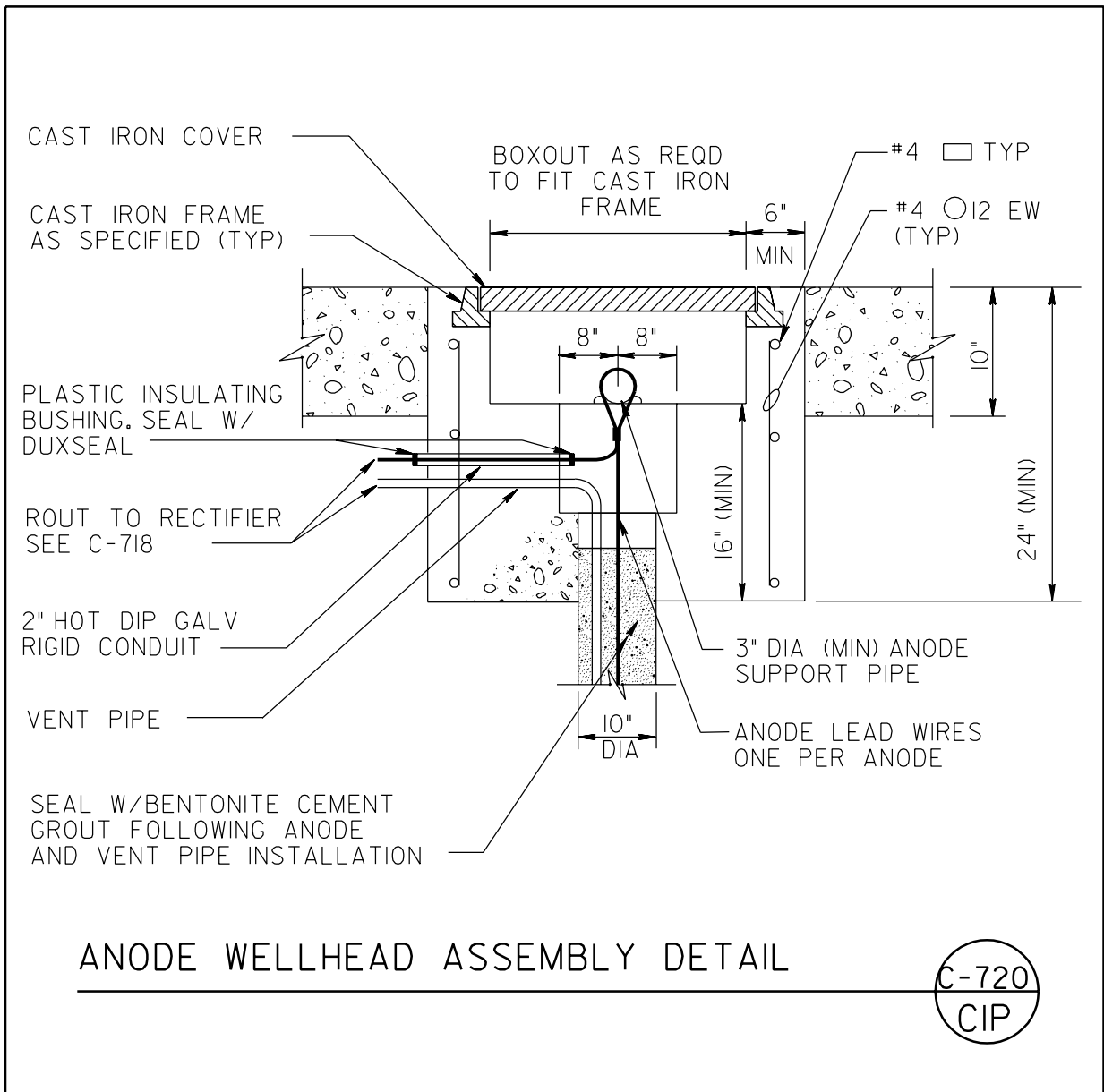


STANDARD  
DETAIL

CIP

DEEP WELL ANODE BED

C-719



REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

**ANODE WELLHEAD ASSEMBLY DETAIL**

**C-720**

COPPER BOLT, NUTS, WASHERS  
AND LOCKWASHERS (TYP)

COPPER SOLDERLESS LUG  
CONNECTION (TYP)

0.001 OHM - 25 AMP  
SHUNT (TYP)

SLEEVE NYLON  
WIRE MARKER (TYP)

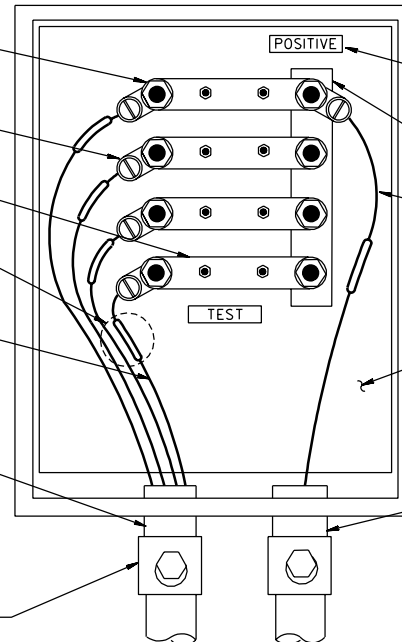
#8 AWG ANODE  
LEADS (BLACK)  
NUMBER AS REQUIRED

RIGID GALVANIZED STEEL  
CONDUIT WITH ANODE  
LEAD WIRES FROM DEEP  
WELL ANODE BED

SEAL TYPE CONDUIT FITTING  
(TYP) WITH COMPOUND AS INDICATED

NOTE:

MOUNT JUNCTION BOX  
AS INDICATED SEE C-718



LABELS ON TERMINAL  
BOARD AS INDICATED

1" x 1/4" COPPER BUS BAR

RECTIFIER POSITIVE CABLE (BLACK)

1/4" THICK MICARTA  
TERMINAL BOARD

NEMA 3R JUNCTION BOX  
ENCLOSURE AS SPECIFIED

1-1/2" DIA RIGID GALVANIZED  
STEEL CONDUIT

## IMPRESSED CURRENT DEEP WELL ANODE JUNCTION BOX

C-721  
CIP

REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego

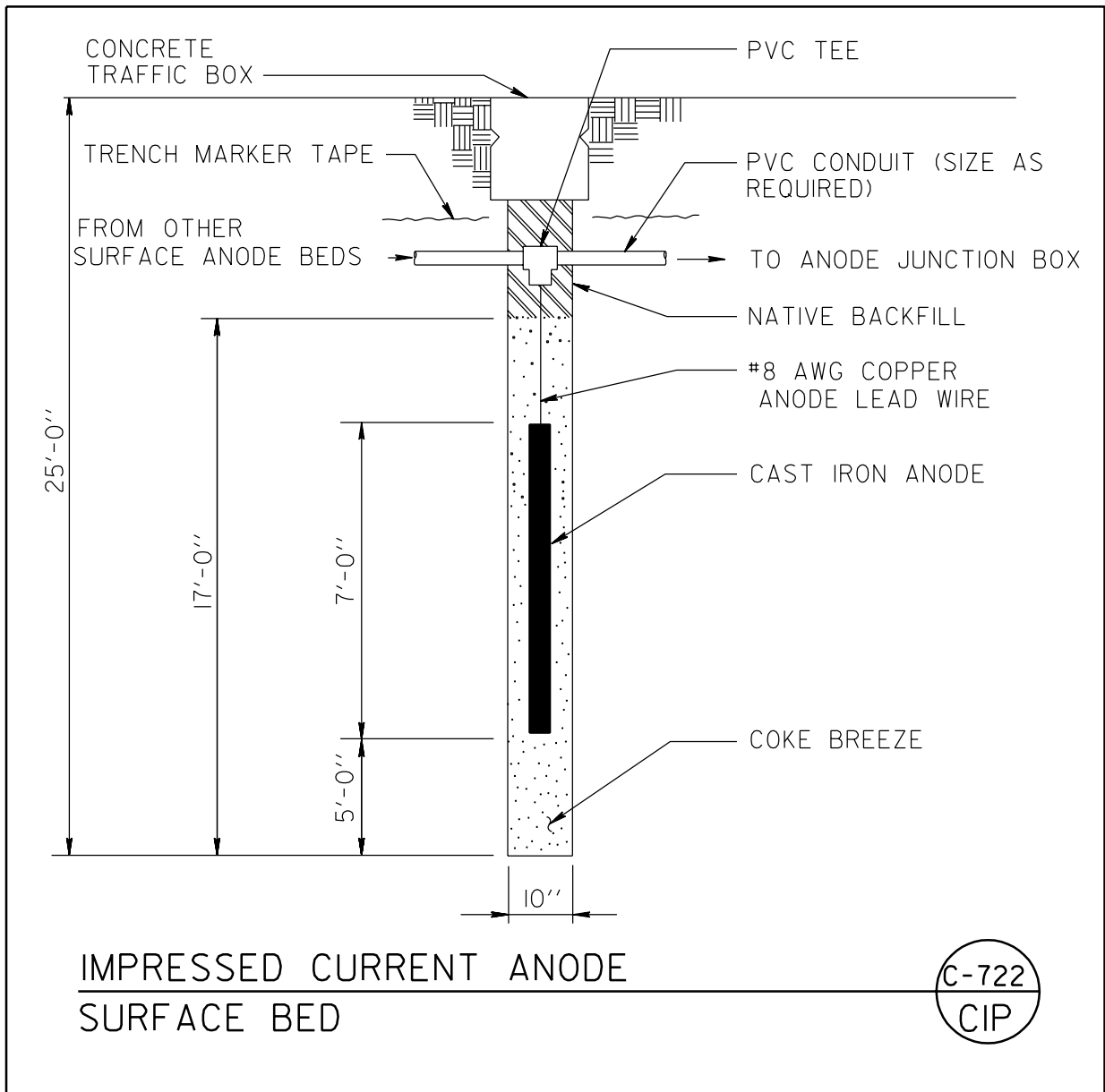


STANDARD  
DETAIL

**IMPRESSED CURRENT DEEP WELL  
ANODE JUNCTION BOX**

CIP

C-721



REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego

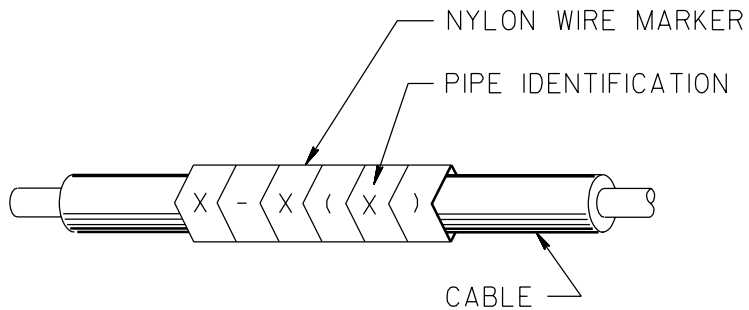


STANDARD  
DETAIL

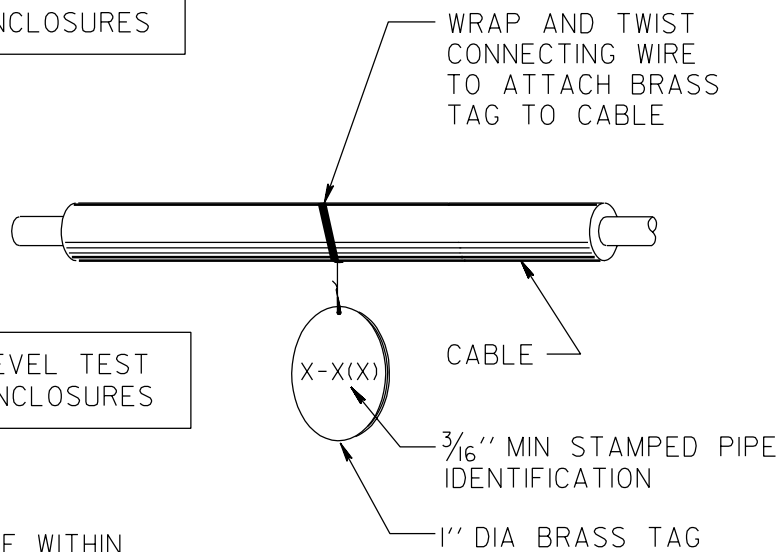
CIP

**IMPRESSED CURRENT ANODE**  
**SURFACE BED**

C-722



FOR USE IN JUNCTION BOXES  
AND ABOVE GRADE ENCLOSURES



FOR USE IN GRADE LEVEL TEST  
AND BOND STATION ENCLOSURES

NOTE:

IDENTIFIER SHOULD BE WITHIN  
4" OF END OF WIRE

CABLE IDENTIFIER

C-723  
CIP

REVISION	BY	APPROVED	DATE

**WATER DEPARTMENT**  
City of San Diego

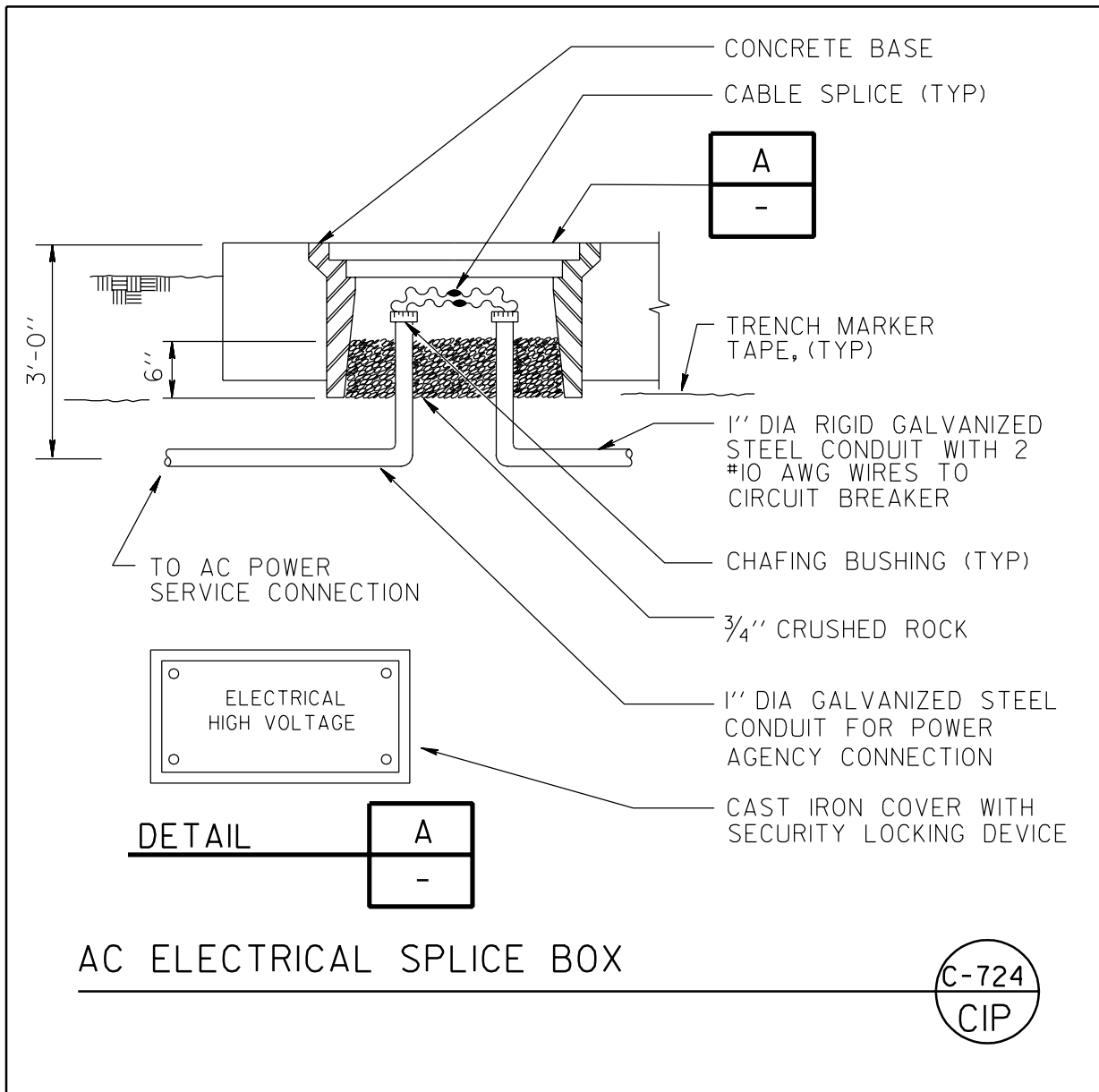


STANDARD  
DETAIL

CIP

CABLE IDENTIFIER

C-723



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WATER DEPARTMENT  
City of San Diego

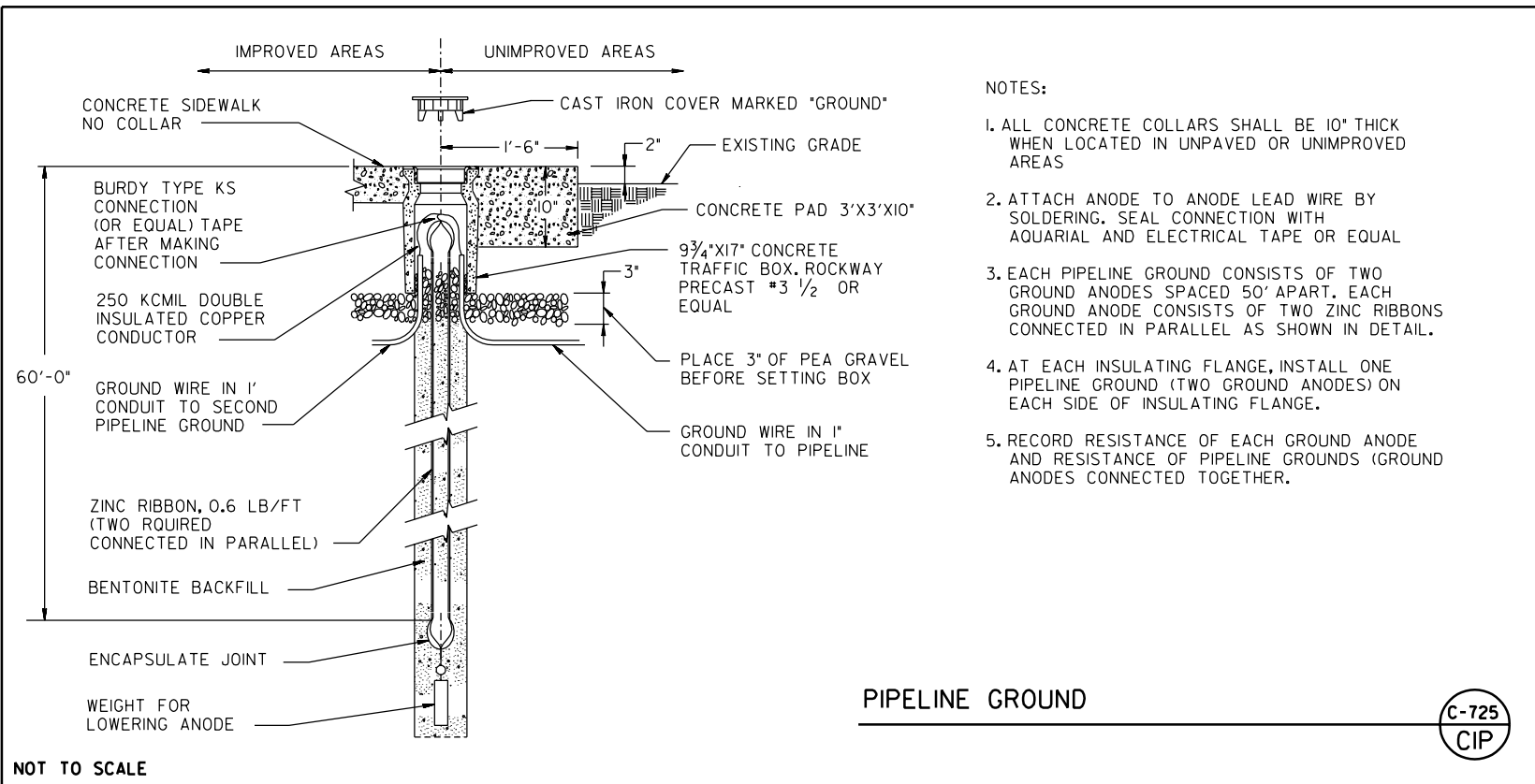


STANDARD  
DETAIL

CIP

AC ELECTRICAL SPLICE BOX

C-724



REVISION	BY	APPROVED	DATE
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**WATER DEPARTMENT**  
City of San Diego



STANDARD  
DETAIL

CIP

PIPELINE GROUND

C-725